AMATEUR TELEVISION QUARTERLY

$3.95

VOLUME 10 #2
SPRING 1997

ISSN 1042-198X
USPS 003-353

7 Build it projects!

13 cm ATV TX/RX Cheap and Easy!

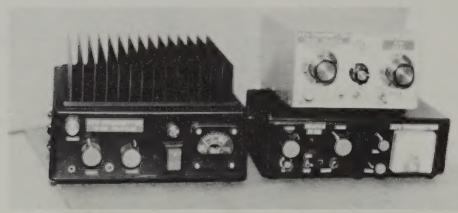
$40 off-the-shelf 23 cm FM ATV RX

DAYTON:

FRIDAY: May 16, 7 PM, West Carrollton Lions Club 435 E Main St.
Contact John Hey 937-859-5294 or W8STB@concentric.net
SATURDAY: May 17 Hamvention RM 3, 2:45-5:00.
C U THERE!!

PAULDON ASSOCIATES

210 Utica Street Tonawanda, NY 14150
Telephone and Fax: (716) 692-5451



Video Modulators and Power Amplifiers
Multi-Channel 57-60 included
421.25-439.25 MHz

AM Video---Audio sound---Digital readout

7w P.E.P. Power Amplifier included
no T/R — PD-440NA $225.00

7w P.E.P. Power Amplifier included
T/R — PD-440NTR $295.00

10w P.E.P. ATV Transmitter boards (Completely wired and tested video and audio)
4 Freq. switchable — PD-ATV-5K $200.00
1 Freq. included — Extra Xtals ..... $16.00ea.

FM Boards 33cm and 23cm

20mw P.E.P. (Completely wired and tested video and audio)
2 Freq. switchable — PD-900FMK $170.00
1 Freq. included — (Additional information available on request)

70cm and 33cm Downconverters

Diecast enclosures $92.00

Power Amplifiers
70cm

PD-440N	0.5-5w in = 18w out, T/R (linear)	$129.00
PD-440N-1	0.5-5w in = 35w out, T/R (linear)	$149.00
PD-440N-2R	4w in = 55w out, No T/R (linear)	$199.00
PD-440N-2	0.5w in = 50w out, T/R (linear)	$285.00
PD-440N-3	3-4w in = 50w out, T/R (linear)	$225.00
PD-440N-4	3-4w in = 180w P.E.P. (class "A")	$1200.00

Linear 33cm

PD-33 VLP-1	1mw in = 6w out	$120.00
PD-33 LP	0.5-1w in = 6-7w out	$135.00
PD-33 HP	6w in = 18w out	$149.00
PD-33 LHP	1w in = 18w out	$265.00
PD-33 LHP-1	1w in = 16w out, T/R	$305.00

FM 33cm

PD-900N	1w in = 8-10w out	$65.00
PD-900N-1	1w in = 20-24 w out	$143.00

Power Amplifier 1.2 GHz, Linear

PD-1200N	1w in = 18w out	$169.00
PD-1200N-1	3w in = 36w out	$305.00
PD-1200N-1A	1w in = 36w out	$375.00
PD-1200N-2	1w in = 16w out, T/R	$214.00
PD-1200N-4	3w in = 32w out, T/R	$385.00
PD-1200N-5	10mw in = 18w out	$295.00

"Rabbit" Transmitters and Receivers (900MHz)

Modified and Standard
2 standard Frequencies
Receiver and transmitter $59.00
Same unit as above modified for P.A. use $69.00

Power Amplifiers for above 2-4w output

12-13.8 Vdc operation with BNC or "N" connectors PD-33VLP-1 ..... $120.00

If you are dissatisfied with any purchase, you may return within 10 days for a complete refund.
Payment : Bank or P.O. money orders,C.O.D., or Credit card (MC or Visa)

210 Utica Street Tonawanda, NY 14150 Telephone and FAX: (716) 692-5451
E-Mail PauldonHAM@AOL.com
PAULDON ASSOCIATES

ATV Transmitters and Transceivers
420-440 MHz (70cm)

AM Video 10w P.E.P., 2 pos. XTAL switch, 1 XTAL included------$305.00 PD-ATV-5

AM Video 55w P.E.P., 2 pos. XTAL switch, 1 XTAL included------$545.00 PD-ATV-50

AM Video 10w P.E.P., 2 pos. XTAL switch with down converter---$409.00 PD-ATV-4

908-925 MHZ (33cm)

AM Video 6w P.E.P.----------$269.00 PD-900-S
Stable saw technology, Available on 906,913,916.50,924 MHZ your choice.
Video output only, Size= 4.5" x 2.5" with fin type heatsink.

AM Video 1w P.E.P.----------$305.00 PD-900
Video and subcarrier audio (3) XTAL's, 2XTAL's included - 910.25 and 923.25 MHz
Size= 4.5" x 7.5" x 1.75"

AM Video 1w P.E.P.----------$389.00 PD-900-D
Video and subcarrier audio (3) XTAL's, 2XTAL's included - 910.25 and 923.25 MHz
T/R switching, meter and sampler, Size= 4.5" x 7.5" x 1.75"

AM Video 18w P.E.P.----------$549.00 PD-900N-3
Video and subcarrier audio (3) XTAL's, 2XTAL's included - 910.25 and 923.25 MHz
Size= 4.5" x 7.5" x 1.75" fin type heatsink.

AM Video 18w P.E.P.----------$599.00 PD-900N-3C
Video and subcarrier audio (3) XTAL's, 2XTAL's included - 910.25 and 923.25 MHz
T/R switching, meter and sampler, Size= 7.5" x 7.5" x 2" fin type heatsink

FM Video 5w P.E.P.----------$319.00 PD-900FM-1
Provisions for 2 XTAL's. 1 included-916 MHz
R.F. phase lock loop and amp sync level adjustment
Subcarrier audio 4.5-6.9 MHz video and audio controls

1.2 GHZ (23cm)

FM Video 3w P.E.P.----------$299.00 PD-1200FM-1
Provisions for 2 XTAL's. 1 included-1.265 GHz
R.F. phase lock loop and amp sync level adjustment
Subcarrier audio 4.5-6.9 MHz video and audio controls

Preamplifiers

420-450Mhz specs: (Choice of BNC or "N" connectors)

PD-440S — Single gate; MGF1302 transistor; Noise Figure = 0.5db; Gain = 16db **$56.00**

PD-440S-1 — Single gate; Noise Figure = 0.38db; MGF1302 transistor; Gain = 17db; 12-13.8 volts required.; Voltage regulated (5v); Toroid coil is in output with capacitor coupling at output; Input uses a high "Q" piston trimmer **$90.00**

902-928 Mhz specs: (choice of BNC, "N", or SMA connectors)

PD -900 — Single gate; Low noise; 0.5 db Noise Figure; MGF 1302 GaAs FET Transistor; Gain = 15 - 16 db; Piston type trimmer capacitor; High "Q" trim pot; Voltage regulated (5v); Fixed inductor ,capacitor isolated output **$89.00**

TPD-900TM — Tower Mount with "N" connectors **$96.00**

1240-1296Mhz specs: (Choice of BNC, "N", or SMA connectors)

PD-1200 — (Other specs. Available upon request); HEMT Device; Low noise; 0.5 db Noise Figure; Gain = 15db; Voltage regulated **$89.00**

TPD-1200TM — Tower mount with "N" connectors **$96.00**

2.3 Ghz Specs: (Choice of BNC, "N", or SMA connectors)

TPD-2300 — 3 stages; low noise; Gain = 17 db; Write or call for specs. and layout **$140.00**

Video line samplers

70cm - 33cm

Video output	PD-VD-1	$79.00
Video and R.F. output	PD-VD-1A	$96.00

Call or write for 18 page cataloge.

AMATEUR TELEVISION QUARTERLY
VOLUME 10 #2 SPRING 1997

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Cartoons: Robert Beasley K6BJH
Translations: Andrew Emmerson G8PTH

COVER PHOTO

The easiest way to get on ATV on the 13 cm band, a Wavecom Jr., and a few simple ham modifications. Photo by W8DMR

Authors guide: Send in something legible. If you can do it in typewritten (computer print out) form in a laser text great, dot matrix is OK too. You can send it by E-mail to ATVQ on America OnLine, or via the US Snail to ATVQ 3 N Court St., Crown Point, IN 46307. If you send a computer disk, have it formated to an IBM (dos) machine, not Mac. If possible use WordPerfect, any version, or something that will convert. Diagrams should be clear, on plain paper (not lined) not Xerox copies. Photos can be color or black and white. If you have spell check, use it. Since this is a one person philanthrophic effort we do not pay for material. If you want a free subscription in exchange or if I can find any Test Pattern mugs you can have one of those. ATVQ accepts all material at the authors risk. Indicate if you want any of it back. ATVQ also accepts and may publish any mail it receives via its electronic mailboxes. We publish the authors information as it is on the E-mail header. We try to be as accurate as any other publication, but sometimes we are as bad as the others too. Most material is done in WP 5.2 and layout is in PageMaker. 5.0

Because my TV station work schedule starts at 7 am to 7-9 PM, and most weekends lose at least one day to remotes and other broadcast stuff at my real life job, the best way to "talk" to me is via E-mail or fax, lastly the answering machine. I get to it about once a week. You can also find me at home typically Sundays between 10 and 4 if I'm not working, or Saturday 9 to 3 if I am not working. That's how life is these days. 73 Henry KB9FO

CONTENTS:

GET A FRIEND TO SUBSCRIBE

Most ham magazines have seen a decrease in readership. QST now reaches only 25% of the ham population, Westlink Reports ceased publication this year, and ad dollars are harder to come by then ever. While many hams are on the WWW, many more are not. Besides good material, a magazine needs an ever increasing base of subscribers to attract advertisers and good writers this may look like a one person effort, but it isn't. You need to do your part too. Get a friend to subscribe today, and help me keep the ATV community in touch. Please note that due to postal rate changes, some rates are up, and some down. Canada is now closer to US prices. Two subscribers are now busy translating some nice projects to English for publication in the Spring (Dayton) issue. Two others are working on WEB pages where back issues will be posted. Won't you help by being our "subscription agent" in your area? Thanks 73 Henry KB9FO

The 2.4 GHz BAND

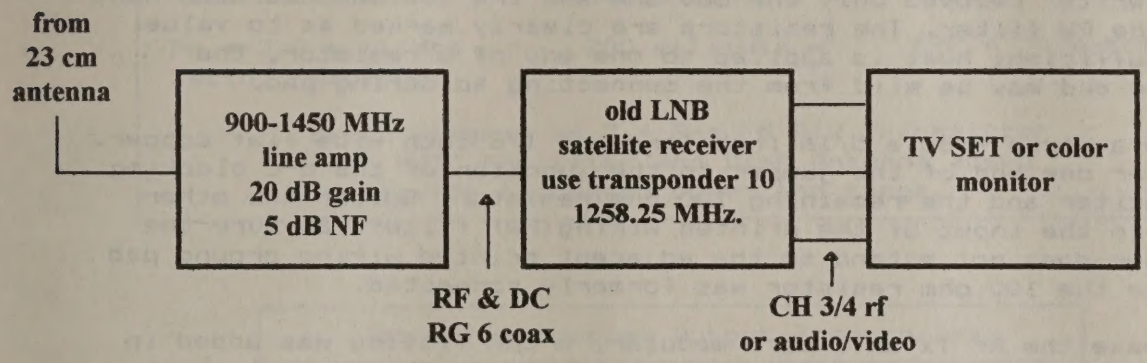
This band may be new to many, so here is the allocation we still have in this band. 2300-2305 MHz is designated as no primary user, and hams have dual secondary use. 2305-2310 MHz hams are secondary with primary service for fixed, mobile and radio location. 2390-2400 MHz hams have on a primary basis. 2400-2402 MHz hams are secondary, (no primary user). 2402-2417 MHz hams are primary. 2417-2450 hams are co-secondary to government stations. Hams using 2400-2450 MHz may receive interference from industrial scientific and medical devices.

So in total, we have 2300-2310, and 2390-2450. Generally ATV is at 2441 MHz but other frequencies are also in use. The ARRL band plan has atv at 2418-2430 FM video and 2438-2450 for FM video and 2390-2396 for AM video.

A NO-SOLDER LOW-COST FM ATV RECEIVER

by Bill Parker, W8DMR

BLOCK DIAGRAM OF 1200-1300 MHz FM ATV RECEIVER



The satellite receiver supplies 15-20 vdc to the line amp. Use a dc blocking fitting between the antenna & input to line amp. Lower loss coax may be used between the line amplifier & the receiver. The Radio Shack Line Amplifier, P/N 15-1115 sells for $29.95. The satellite receivers can be purchased at a hamfest, typically $20 to $30. And most of the receivers usually have a channel 3 or 4 RF output also. Try transponder channels 9 to 12 for other 23 cm frequencies. Note, a C-band LNA, 3750 to 4250 MHz will not perform the task. [but could be retuned for the 9 cm band! ED.]

Omitting the line-amp will yield very poor results due to the lack of gain. The FM limiter portion of the satellite receiver will have insufficient signal to perform the limiting function and a low signal to noise ratio occurs. The video picture will contain much noise. Even though the line amplifier is not a low noise type of preamp, it still works very satisfactorily if the 23 cm signals are a of a reasonable level. The amplifier draws approximately 50 mils when a 20 V dc is applied.

Two F-connectors, about 50 to 60 feet of RG-6 75 ohm cable, a couple of shielded jumper cables with RCA connectors on the ends and you can quickly & easily receive 1240-1300 FM ATV pictures that are impressive. And there is not any need to wait for the soldering iron to heat, just simply plug-and-play and enjoy interference-free ATV pictures!

CHEAP AND EASY 13 CM

GETTING ON 2.4 GHz FM ATV

The WaveComm, 2.4 Ghz Tranmitter and Receiver may be puchased for about $125 (Qty of 5, from Mel Shadbolt). The TX & RX are of excellent quality and workmanship. The main disadvantage is the very low output power of about 0.25 (1/4) of one milliwatt.

There is an 8.9 dB attenuator that can be removed. The pad consists of three resistors, 100, 680, 100 ohms. The pad is located after a d-c blocking capacitor and before the PW filter. The resistors are surface mount components (SMC) and require a little skill to remove without damage to the PWB.

The writer removed only the 680 ohm and the 100 ohm resistor next to the PW filter. The resistors are clearly marked as to value. If sufficient heat is applied to one end of a resistor, the other end may be slid from the connecting soldering pad.

Make a strap from a 5/16 inch long and 1/8 inch wide flat copper. Solder one end of the jumper to the junction of the d-c blockimg capacitor and the remaining 100 ohm resistor. Solder the other end to the input of the printed wiring(PW) filter. Be sure the jumper does not extend to the adjacent printed wiring ground pad where the 100 ohm resistor was formerly connected.

To make the RF TX unit more modular, a SMA fitting was added in place of the antenna cable. The center lead must be kept short in length and the shield of the SMA connector must be soldered to the ground foil of the PWB and the shield case.

Removing the 8.9 dB pad will raise the output power from 0.25 milliwatts to about 2.5 milliwatts. The next step is to add a MMIC amplifier, Type ERA-5, manufactured by Mini-Circuits. The amplifier has about 20 dB of gain (100 times) at 4 GHz. It will draw about 80 milliamperes at 5 volts d-c. This will increase the output power to about 200 milliwatts or 0.20 (1/5) of a watt.

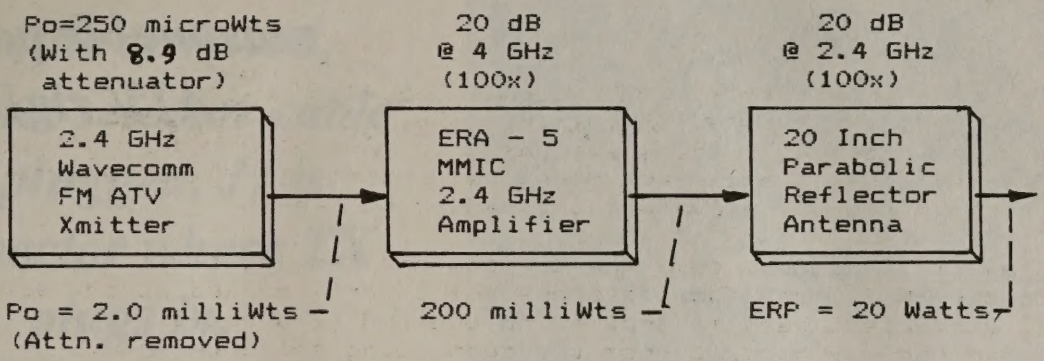
With a 18 inch parabolic reflector antenna, providing a gain of about 20 dB, the effective radiated power (ERP) will be approximately 20 watts excluding any feedline loss. The small PW antenna supplied with the units are advertised as circularly polarized antennas. Most ATV enthusiasts will use external antennas of linear polarization, be it vertical or horizontal.

If the small PW antenna is replaced at the receiving unit with a antenna similar to the transmitting antenna, the LOS of range will be extended even more.

Study the accompanying photographs before starting this simple and worth while modification. The 300 foot range will be extended to a line-of-sight (LOS) range of many miles. The quality of the received color video and stereo sound is excellent. And best of all, interference free.

CHEAP AND EASY 13 CM

GETTING ON 2.4 GHz FM ATV



Block Diagram of 2.4 GHz FM ATV Transmitter with MMIC Amplifier and Dish Antenna added to provide increased power and range.

Table of Wavecomm Output Frequencies	
Channel Number	Frequency (MHz)
One	2,433.75
Two	2,452.75
Three	2,472.75
Four	2,410.75

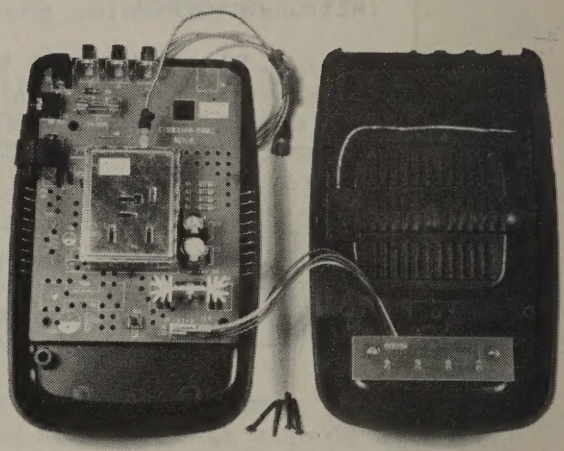
Observe the channel frequencies are not in ascending order as one might expect. Channel 4 is the lowest, while Channel 3 is the highest. The channels are spaced approximately 20 MHz apart or about +/- 10 MHz. The exact reasoning for the nonlogical frequency spacing is not known at this time. It is probably to reduce interference when several links are operating in close proximity to each other.

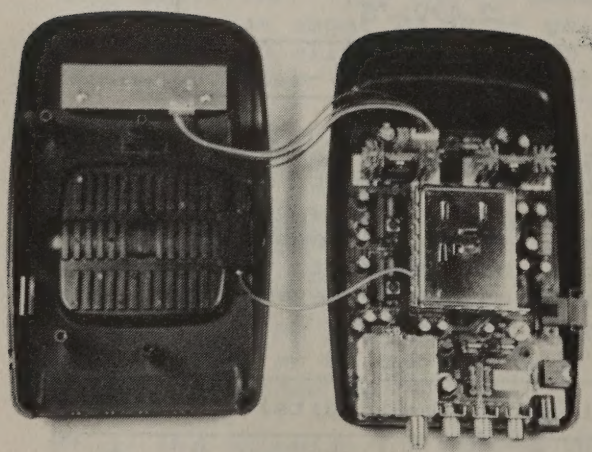
MMIC Characteristics (Mini-Circuits)					
Type Number	Freq. R. (MHz)	Gain (dB)	-1 dB Comp. (dBm)	NF (dB)	IP3 (dBm)
ERA-5	4,000	19.0	+36	4	+36

CHEAP AND EASY 13 CM

A typical ad for the Wavecom, basis for a reasonable power ATV rig!

Top and bottom of the transmitter



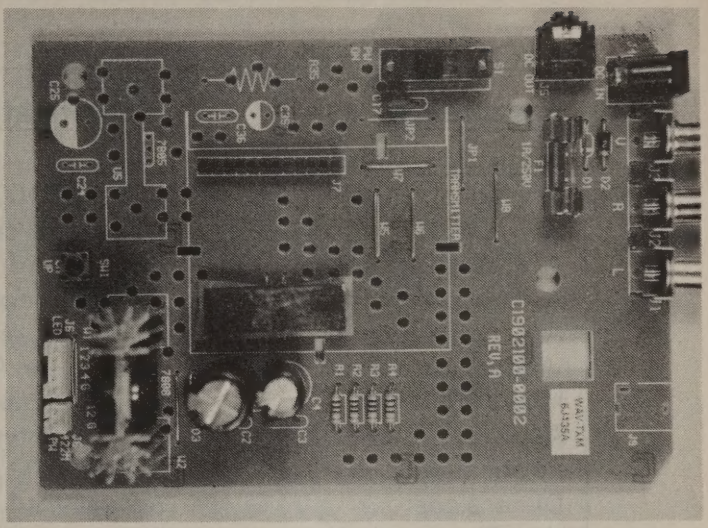


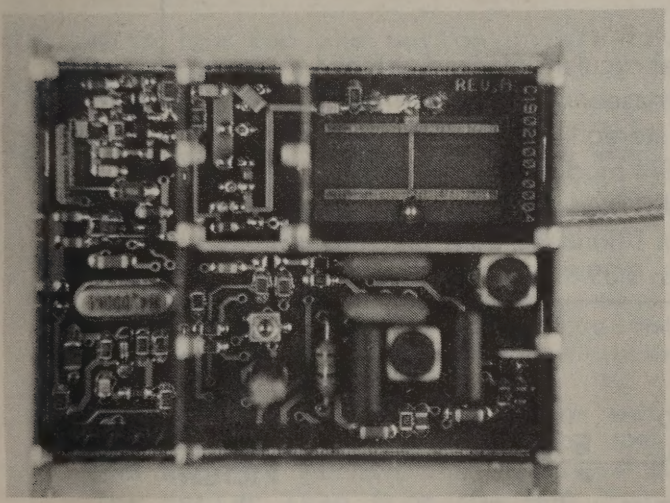
top and bottom of the receiver

Photos by W8DMR

CHEAP AND EASY 13 CM

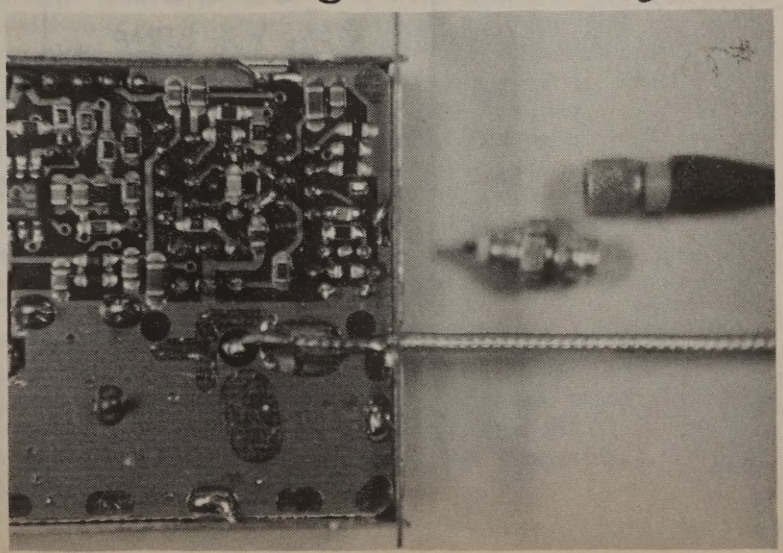
Main circuit board, TX module removed, channel selector cable unplugged, J7 is connector where TX plugs in.



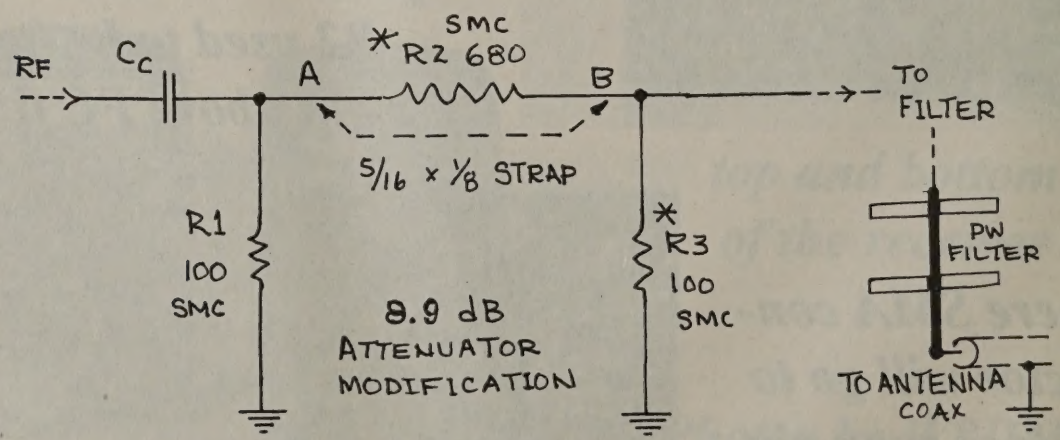


R2 qand R3 have been removed, the 5/16" long by 1/8" wide strap installed to replace where 680 ohm R2 used to be.(top right above PC filter

Where SMA connector will go to replace coax pig tail.



Parameters	Specifications
Transmitter; Model Tx 888	
A/V signal range	300 feet (100 meters) clear line-of-sight
A/V antenna	Directional circular-polarized antenna
A/V transmit power	FCC Part 15 compliant
A/V frequency band	2.4 GHz frequency band
A/V modulation	FM (color video and high fidelity stereo audio)
Video input format	Available in NTSC or PAL
Video input level	Standard baseband color video level
Audio input level	Standard stereo line level
Power supply	12 Vdc, 500 mA
Dimensions	6.9 x 4.4 x 1.8 inches; 18 x 11 x 4.6 cm
Weight	12 ounces; 0.34 Kg
Receiver; Model Rx 999	
A/V antenna	Directional circular-polarized antenna
Video output level	Standard baseband color video level
Audio output level	Standard stereo line level
A/V output	Channel 3/4 modulated
Power supply	12 Vdc, 500 mA
Dimensions	6.9 x 4.4 x 1.8 inches; 18 x 11 x 4.6 cm
Weight	14 ounces; 0.39 Kg



* REMOVE R2 & R3. ADD JUMPER, A TO B.

GETTING ON 2.4 GHz FM ATV

Remove the four bottom screws. The main printed wiring board is fastened with a fifth screw located under the shielded TX unit. The metal TX module is held very firmly to the PWB by an adhesive piece of black foam. To allow removal of the TX module, use an Exacto knife to release it from the foam.

The fifth screw remains. There aren't any parts on the under side of the main PWB. The top and bottom shield covers on the TX module eventually need to be removed. Later when replacing the top and bottom shield covers, they must be oriented the same way as before they were removed. Important.

The regulator IC is a 7808. There are 3 IC's in the TX module, namely: 1) PIC-16C54A, 18 pin, 2) TSA-5055T, 16 pin, and 3) TL-NE592D, 8 pin. All are of the flat pack variety. The Tx unit is connected via a 10 pins to the main PWB. If the Channel Selector connector is removed for ease of handling, be sure to reconnect it when reassembly occurs.

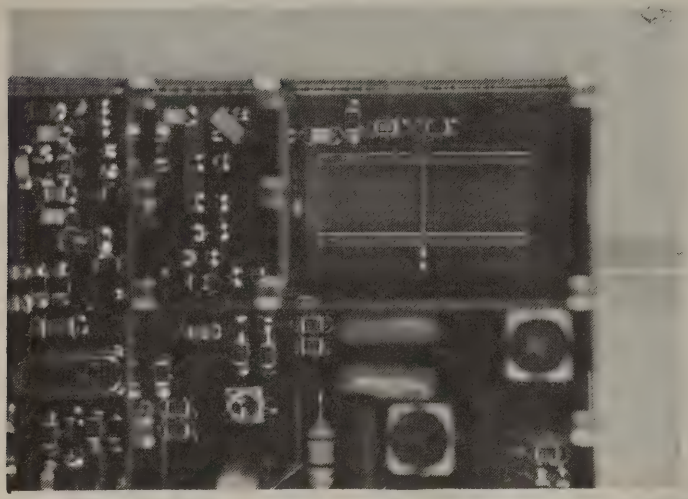
With the top and bottom shield covers removed, locate the 9.8 dB attenuation pad, conisting of 101, 680, 101 labelled resistors. Remove the 680 and the 100 ohm resistors. Install a short jumper strap to complete the RF circuit. Observe the before & after photographs of the TX module when the covers were removed.

Remove the miniature coax cable that is connected from the output of the PW filter. The d-c resistance of the coax to the small square-encased C-P antenna will measure opened circuited. If you managed to short the coax, it will not. If you remove a 'C' ring at the hinge of the antenna, the brass pin holding it may be removed, allowing the antenna assembly to be separate.

One side of the SMA connector was ground flat by employing a Dremel tool. This permits the SMA connector to lay flat on the PWB and fit within the envelope available. See photograph. The center lead from the SMA connector to the PWB should not be longer than absolutely necessary. Solder the case of the SMA connector to the PWB. The SMA connector uses teflon insulation and will not be damaged when soldering the case to ground. The machine nut supplied with the SMA connector is not needed. After the SMA connector is installed, replace both covers.

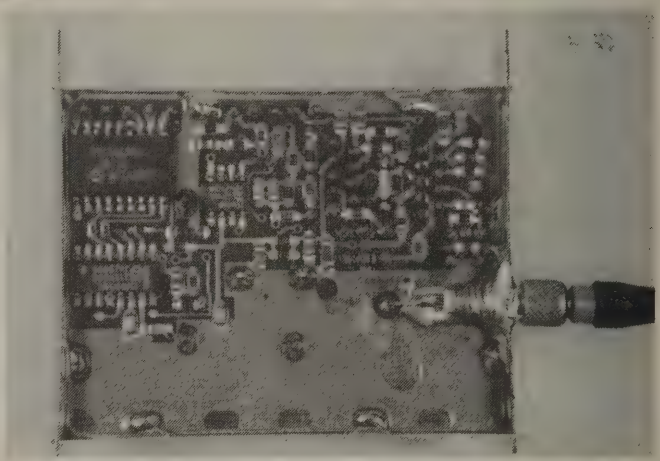
Fasten a piece of miniature coax with a mating SMA connector to the SMA connector installed on the TX module. Insert the TX unit into the PWB. A small relief notch or hole is needed in the outer black plastic case to allow the coax cable to exit.

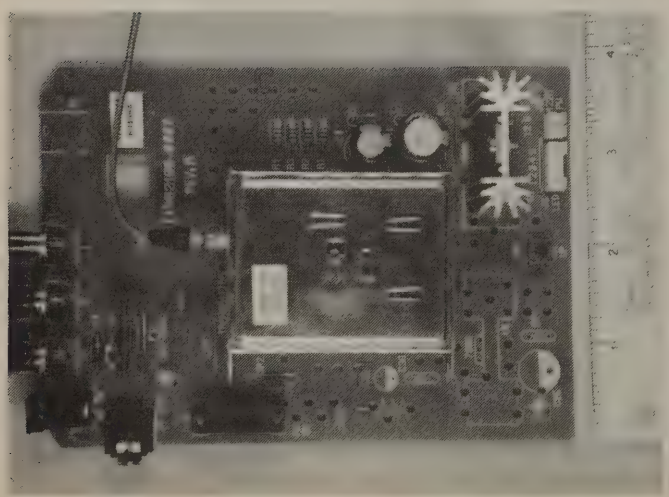
Re-install the small black plastic slide that moves the OFF-ON switch. Connect the 5-wire cable for the Channel Selector and LED assembly to the PWB. Replace the four bottom screws that hold the outer case-halves together. As an option, the MMIC amplifier is the next step. Decide where it will be located, either internally or externally.



Before R2, R3 were removed (top right corner above PC filter)

SMA connector installed with mating cable and connector.

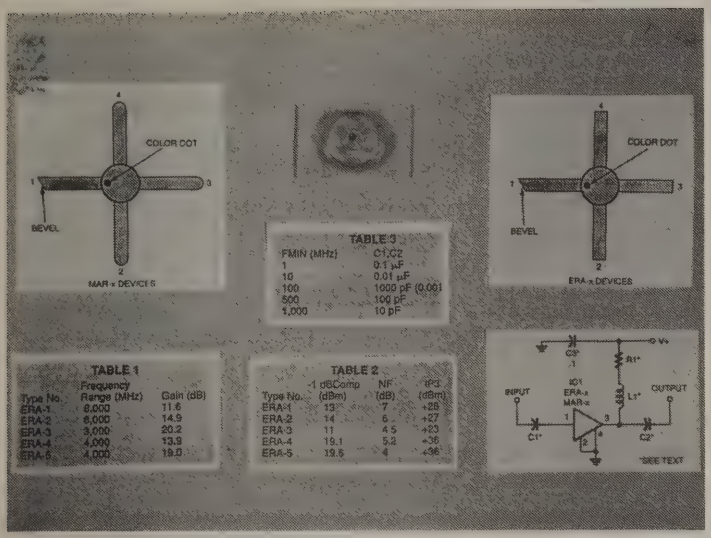




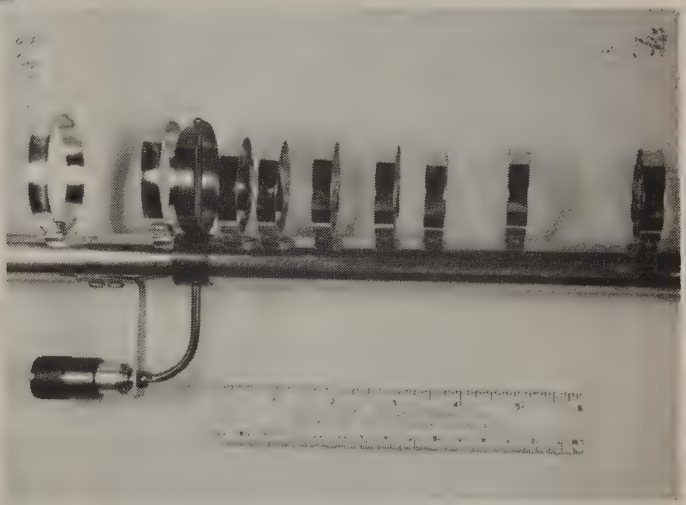
Completed unit, with SMA connector and RF pad removed. Note ruler for size comparison.

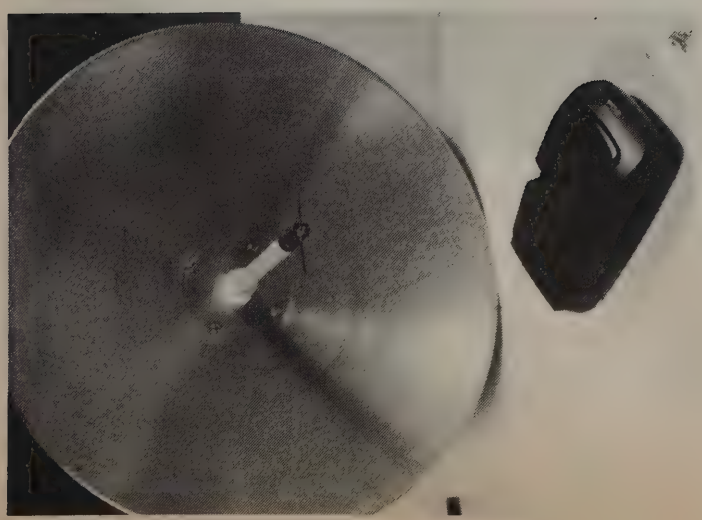
CHEAP AND EASY 13 CM

ERA-5 device data



Business end of a home made 33 element 2.4 GHz loop yagi as made by W8DMR





18" Dish antenna with dipole and sleve balus, modified for TX with SMA and cable.

Parameters	Specifications
Transmitter; Model Tx 888	
A/V signal range	300 feet (100 meters) clear line-of-sight
A/V antenna	Directional circular-polarized antenna
A/V transmit power	FCC Part 15 compliant
A/V frequency band	2.4 GHz frequency band
A/V modulation	FM (color video and high fidelity stereo audio)
Video input format	Available in NTSC or PAL
Video input level	Standard baseband color video level
Audio input level	Standard stereo line level
Power supply	12 Vdc, 500 mA
Dimensions	6.9 x 4.4 x 1.8 inches; 18 x 11 x 4.6 cm
Weight	12 ounces; 0.34 Kg
Receiver; Model Rx 999	
A/V antenna	Directional circular-polarized antenna
Video output level	Standard baseband color video level
Audio output level	Standard stereo line level
A/V output	Channel 3/4 modulated
Power supply	12 Vdc, 500 mA
Dimensions	6.9 x 4.4 x 1.8 inches; 18 x 11 x 4.6 cm
Weight	14 ounces; 0.39 Kg

TABLE 1

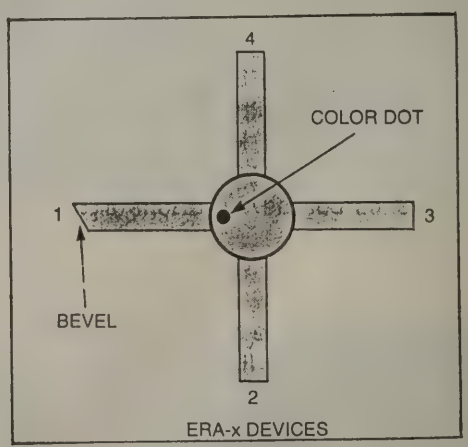
Type No.	Frequency Range (MHz)	Gain (dB)
ERA-1	8,000	11.6
ERA-2	6,000	14.9
ERA-3	3,000	20.2
ERA-4	4,000	13.9
ERA-5	4,000	19.0

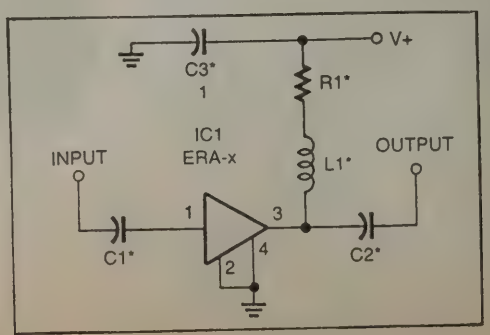
TABLE 2

Type No.	-1 dBComp (dBm)	NF (dB)	IP3 (dBm)
ERA-1	13	7	+26
ERA-2	14	6	+27
ERA-3	11	4.5	+23
ERA-4	19.1	5.2	+36
ERA-5	19.6	4	+36

TABLE 3

FMIN (MHz)	C1,C2
1	0.1 µF
10	0.01 µF
100	1000 pF (0.001
500	100 pF
1,000	10 pF





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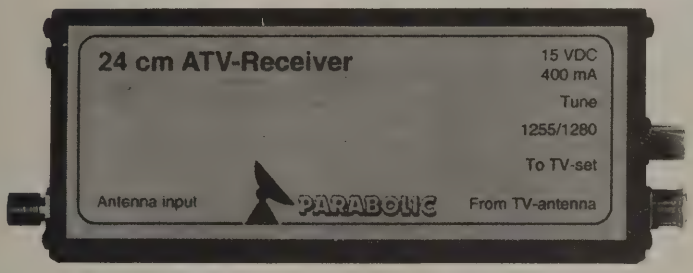

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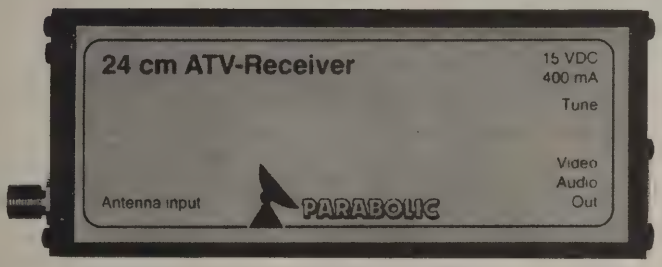

Same receiver with Video and Audio outputs.
Will tune approx. 1200 to 1500 MHz.
Both receivers deliver voltage for a preamp through the coax cable.

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200 mW FM-transmitter that tunes between 1240 and 1279 MHz in 1 MHz steps. Will drive the M57762 to about 10W.

All modules use 15VDC max 400mA (incl. preamp) but 13.8VDC is OK. The transmitter will work as low as 10VDC. A preamp with 1,0dB NF and 40dB gain is also available.
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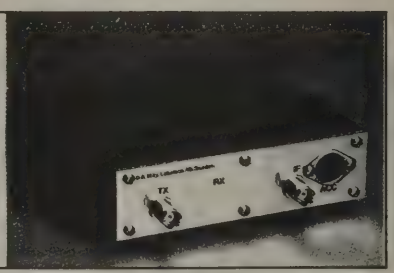
PARABOLIC AMSAT L BAND UP CONVERTER

With a suitable 144 MHz IF you will be able to transmit on 1268 to 1270 MHz with an output of at least 100 mW. This is perfect for driving a power module to more than 10 watts. Using our 1296 MHz Interface and ODU without the pre amp you can mount the PA very close to the up link 1269 MHz antenna thus not losing power in the coax cable. The system will allow for approx. 6 dB of cable loss.

Data	
IF Drive 144 – 146 MHz:	10 mW–1 W (100 mW*) adj.
Output 1268 – 1270 MHz:	> 100 mW
Spurious and harmonic suppression:	> –60 dBc at 100 mW output using two helical filters
TX Delay:	approx. 100 mS
Alarm LED on front:	indicates excessive drive
*=factory tuned	



The 1268 MHz Up Converter is a stripped version of TVR 1296 tuned to the AMSAT Up Link band. The 1296 MHz ODU is available without the pre amp and can be used as a 1268 MHz ODU together with the Interface.

The 2nd port of the Interface can be used for a planned 1268/5668 MHz ODU (Up Converter).

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DEALER

PARABOLIC AMSAT MODE S CONVERTER

This down converter is designed and manufactured by Labetech in Sweden using the latest SMD technique. It uses an HEMT at the input stage and helix filters for excellent selectivity.

The converter is supposed to be mast mounted and the oscillator has a built in crystal oven for stability even at low temperatures. DC is supplied through the cable using an optial bias tee and the box is weather proof.

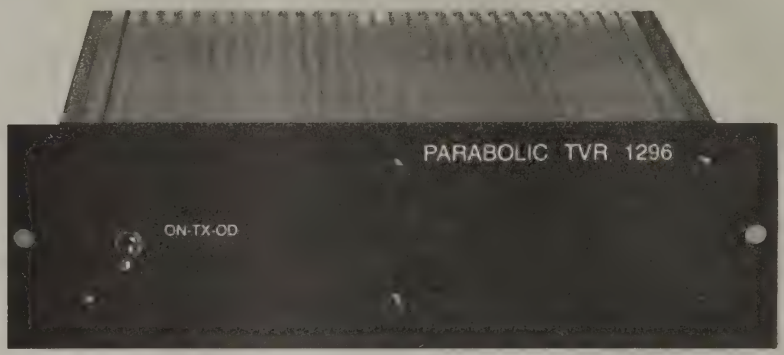
Data

Input:	2400 – 2404 MHz*
Output:	144 – 148 MHz
Noise figure:	max 1,0 dB (typ 0,8 dB)
Gain:	30 dB ± 3 dB
Image rejection:	> 35 dB
Supply voltage:	11,5-15,5 VDC (300 mA)
Connectors:	N-type, female
Size:	75x150 mm excl. the mast clamp
Mast clamp:	50 mm supplied (will accept up to 89mm)

*other frequencies between 2200 and 2450 MHz are available on request.

TRANSVERTER 144/1296 MHZ

This transverter is designed to be the basic module in an advanced amateur radio microwave system that can be extended at any time. All units are manufactured using SMD technique. The IF is 144 MHz and there are a number of options how to control T/R relays etc. These options are listed elsewhere. If you want to use your HF-rig instead of a 2-meter station there will be a 28/144 MHz transverter available very soon. That module will have many unique features in order to handle power and control functions. All modules will fit into a specially designed box or into 19" panels available as options.



The transverter will need at least 10 mW (max 1W) of 144 to 148 MHz signal to deliver a minimum of 100 mW output on 1296 to 1300 MHz. The receive portion of the transverter has a NF of maximum 1,2 dB and the gain is around 20 dB. The supply voltage should be 13.5 VDC at about 0,5 A. There are three LED's on the front panel indicating "Power On/ Off", "Transmitting" and "Excessive input power". Two helical filters on both receive and transmit guarantee an extremely clean signal. Rx and Tx gain is internally adjustable and there is a built-in T/R sequencer.

The 144/1296 MHz transverter will be perfect to drive our 1296 MHz Outdoor Unit (Pre amp and 10W amplifier) using a unique Interface that will handle RF up/down, DC and switching at the same time. Thus you only need one coaxial cable and no extra wires. The same transverter will also be perfect as the IF for our 1296/5760 or 1296/10368 MHz Outdoor Units under development. There is one extra port on the Interface for this purpose.

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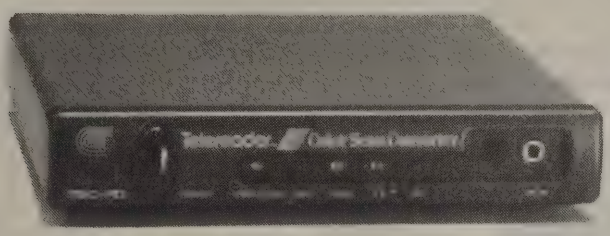

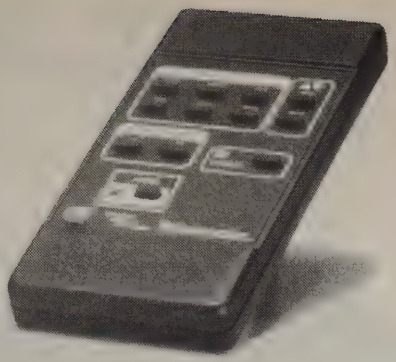

Model TSC-70

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Call for the latest prices on the TSC-70. You can be assured it costs less than your 10 watt ATV transceiver.

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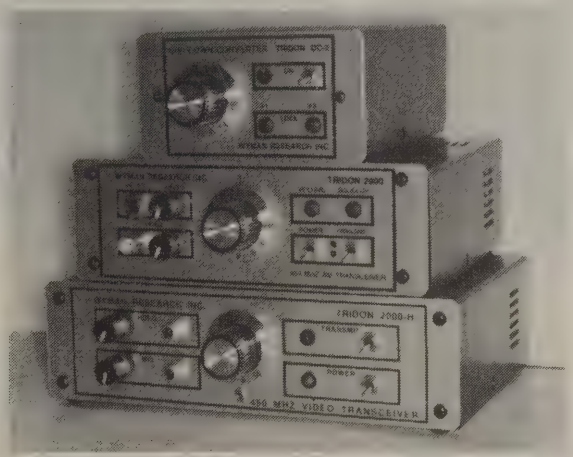

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TVR 1296 Specifications:

Within ( ) indicates how the unit is tuned from factory.

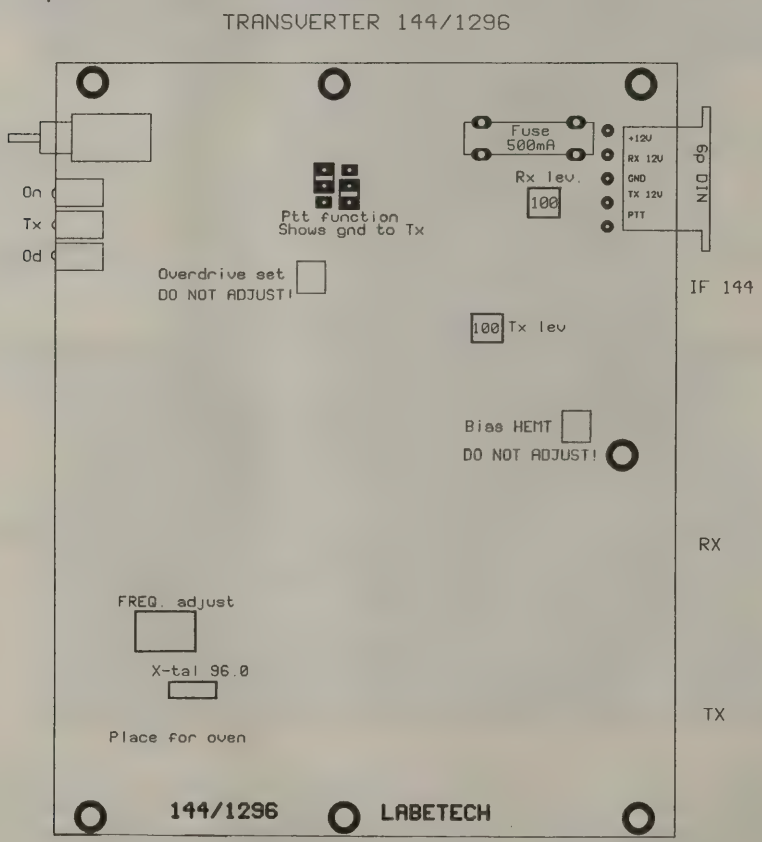
Receive

Gain:	0 - 23 dB (20 dB), adjustable at "RX Lev"
Noise figure:	< 1.2 dB with HEMT
Image rejection:	> 50 dB with two helical filters

Transmit

IF drive 144 MHz:	10 mW - 1 W (100 mW), adjustable at "TX Lev"
Output 1296 MHz:	> 100 mW
Spurious and harmonic supression:	> -60 dBc at 100 mW output using two helical filters
Bandwidth:	144-148 to 1296-1300 MHz
TX delay:	approx. 100 mS
Alarm LED on front:	indicates excessive drive (internally adjustable)

The IF output carries the Ptt functions from i.e. IC-202 or FT-290.



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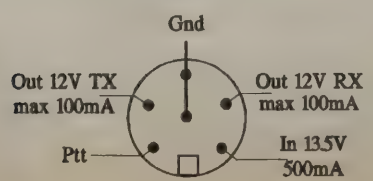
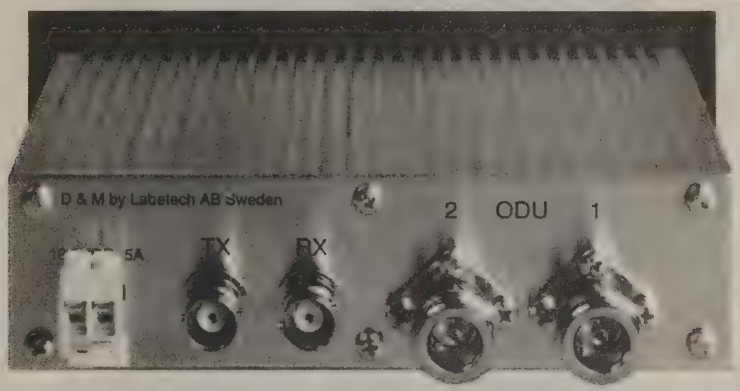


INTERFACE

The interface is used together with the TVR 1296 when operating the ODU (see below). The ODU is supposed to be mounted as close to the antenna as possible in order to eliminate the cable loss. The Interface will handle RF up/down, DC-supply and T/R-switching in a single coax cable, so there is no need for extra wires. It can't be easier! There are two ports and the second one is intended for a 6 or 3 cm (ODU) transverter using the TVR 1296 as IF.

Data

Max input:	1 Watt
Insertion loss:	< 2.5 dB
Isolation between ports:	> 36 dB
Switching:	22 KHz tone
DC in:	13,5 VDC 5 A

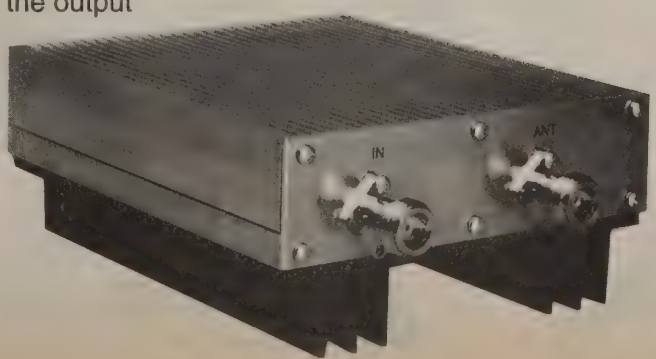


OUTDOOR UNIT

The ODU contains a low noise preamplifier and a power amplifier as well as the T/R switch controlled by the TVR 1296 with Interface. It is supplied with a weatherproof cover (not shown on the photo) and mounting clamps to any tube between 38 and 63 mm. The ODU needs only 25 mW to deliver a minimum of 10 watts output and the 100 mW from the TVR 1296 will allow for 6 dB of cable loss. The input to the ODU must not exceed 25 mW! If a coax with less than 6 dB loss is used, you have to adjust the output from the TVR 1296 accordingly. The ODU can only be used together with the TVR 1296 and Interface.

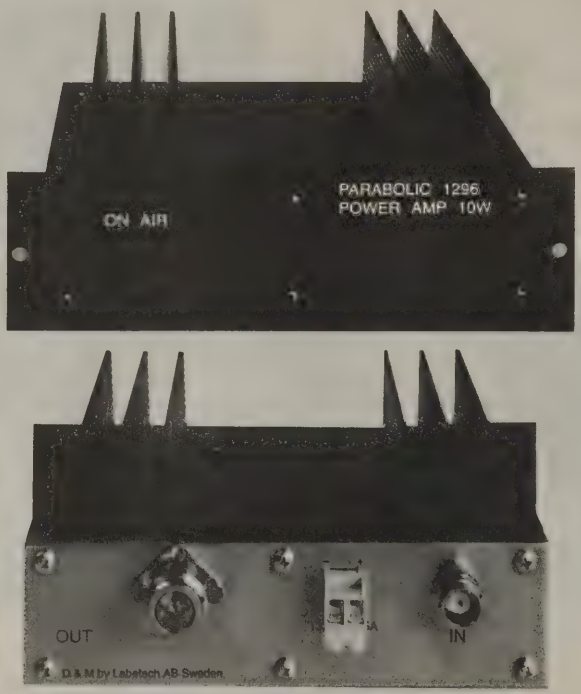
Data

Preamp Gain:	> 16 dB
Preamp NF:	< 1,0 dB (HEMT)
-3 dB bandwidth:	1265-1315 MHz using a helical filter on the output
Input:	25 mW
Output:	> 10 Watts
Spurious rejection:	> -60 dBc
Switching:	22 KHz tone
Connectors In/Out:	N-type

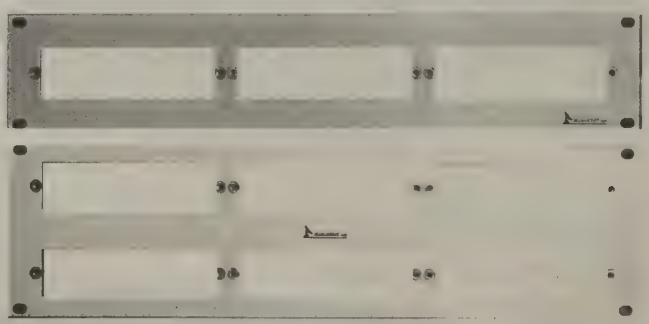


1296 POWER AMPLIFIER

This stand alone PA will deliver a minimum of 10 Watts for 25 mW input. If used together with the TVR 1296, the output of the transverter has to be internally adjusted for 25 mW input to the PA for a specified length of cable between the units. Do not exceed 25 mW of drive as the PA will not be linear then! The PA will deliver a very clean output with spurious rejection better than -60 dB if used with the TVR 1296.



All our modules (except the ODU's) have the same 148x43 mm front panel and we can supply 19" mounting panels as an option. There are two models, one (2U) for three modules and one (3U) for six modules. We will also be able to supply specially designed boxes (not shown here) for various numbers of modules.



We are developing a TVR 2304 (2320) and we plan a similar ODU for 13 cm. Next to come on the market will probably be an ODU containing a 3 cm transverter using the TVR 1296 as IF. Write or fax for information.

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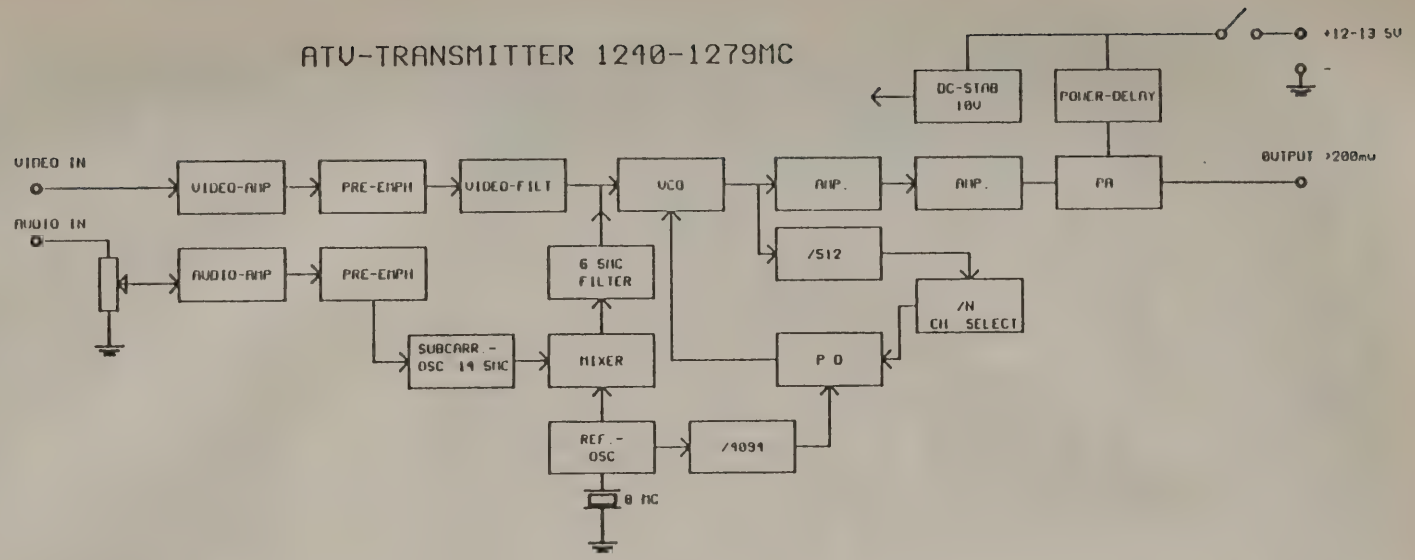
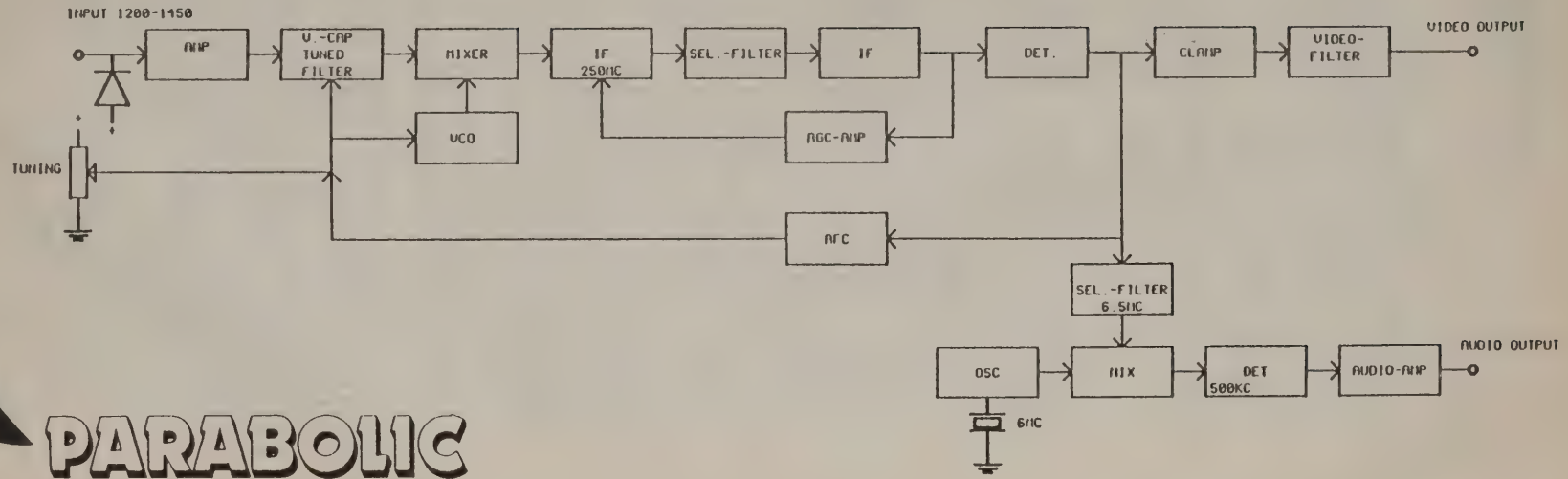
ATV-TRANSMITTER 1240-1279MC



ATV-RECEIVER



PARABOLIC

ATV ELECTRONICS 1200 MHZ AM AND FM TV TRANSMITTER BOARD

by Greg Stayton NT7L

INTRODUCTION

When our ATV club decided to go to 1200 AM here in Phoenix I decided that it was time that I completed my original 1200 Mhz transmitter design goal of providing a transmitter board that could be switched from AM to FM television with on the board switches. Some time ago I attempted this with my original FM design and had problems with FM occuring during AM operation. This problem has now been solved with better isolation of the oscillator from the amplitude modulated output stage as described in this article. I have not been advertising ATV Electronics board level products since most people prefer to buy completed boxed units. However, I still do occasionally sell some of these board level units to experimentors, and Pauldon sells my board level products and also provides units boxed and ready to go. I still enjoy producing these type of circuits, and will probably continue to do so for some time. I would like to thank all of you that purchased several hundred ATV-5 AM 70 CM transmitters out there for providing me with the necessary resources to develop many other projects such as this one. This transmitter has been designed to properly operate into a M67715 class AB brick amp to produce an output of several Watts, and as such is really an exciter board. I have found that it is better to isolate the exciter portion of a transmitter from the higher power amplifier components to reduce the stray rf coupling that can occur back into the video anyway. This isolation most often results in a better looking picture providing more satisfactory on the air performance. My thanks goes to Don Shelley KD7BU for his assistance with this project.

TRANSMITTER DESIGN DESCRIPTION

The transmitter mode, video polarity, and subcarrier generator frequencies are controlled by on-board switches mounted on the front of the PCB. Pads are supplied for standard size potentiometers to be soldered onto the front of the board for video (500 Ohm Pot) and audio (100K Ohm Pot) so that the entire PCB can be mounted into a chassis with no harness wires for these control functions. Harness wires are required for switching primary carrier frequencies programmed into the diode matrix of the synthesizer. Two of these frequencies are preprogrammed into the matrix upon request. Five diode matrix frequency channels are available, and simply require five wires and a ground connected to a front panel rotary switch. Other connections to the PCB are power, video, audio, and rf coax output.

TRANSMITTER CIRCUITRY DESCRIPTION

The transmitter consists of an oscillator, one buffer amp, and a final AM modulated output stage when switched to AM mode. In FM mode the output stage is merely an amplifier/buffer with adjustable rf output level by setting the bias pot R1a. Power level in FM can be set to maximum since linear operation is no longer required. In AM it is necessary to run at about half power to provide adequate dynamic range within the amplifier in order to transmit the required video sync pulses.

VOLTAGE CONTROLLED OSCILLATOR

The oscillator consists of a MAR=8 monolithic amplifier with inductance in the ground leg of the amp for positive feedback to induce oscillations. Bias is set with the 100 ohm R16 resistor and 430 ohm resistor R7 in series with the ground leg to set the amplifier into a region for best positive feedback. I admit here and now that this was determined by experiment, but the oscillator has worked well in other transmitters and seems to have a fairly linear voltage to frequency conversion for use on FM. The tuned circuit consists of a microstrip inductance with a series tuning capacitor C1a and Varactor V1 to ground. The tuning capacitor is used to set the midband frequency of the oscillator establishing the amount of phase shift between the oscillator and the 5 MHZ crystal reference frequency of the PLL. The output of the MAR=8 oscillator is then fed through a 50 ohm microstrip feedline to the MAR=6 buffer amp. The output of the MAR=6 is then fed into a PI Pad 6db attenuator since its output level is too high to drive the MRF901 directly. Extra drive would couple through the Miller capacitor of the MRF901 from base to collector, and drive the high power amplifier even if the bias voltage was removed from the MRF901. The MAR=6 and PI attenuator also provide very good isolation of the oscillator circuitry from output load variations (greater than 20 db isolation). The output of the PI attenuator then is coupled through to the input of the MRF901 with a 2 Pf capacitor and a 0.6" 50 ohm feedline for a power match with the complex conjugate of the input impedance. See the Smith Chart diagram for details of the input, and output matching. The output of the MRF901 is coupled through a 1/4" collector lead and a 47 Pf capacitor to provide a near 50 ohm Available Gain match. The inductance of the output collector lead provides a match that is adequate for a better than 1.5 to 1.0 SWR at the output. The bias is set to run around 35 Milliamps for best linear performance, and the collector bias is set with a pot that controls the voltage output of the IRF 510 Hex Fet which controls the output power level that the exciter board supplies.

PHASELOCK LOOP DESIGN DESCRIPTION

The Phaselock Loop design consists of a Motorola MC12022 divide by 128 prescalar which feeds a Motorola MC145151 phaselock loop chip. Bandwidth of this control loop has been designed to be between

about 10 KHz and 100 Khz. The MC145151 phaselock chip has been connected to a set of pads in a matrix to provide up to five channels preset by diodes. A set of PC type dip switches is provided to establish which control lines to close for a particular frequency so that diodes can then be installed for a chosen channel. Examples of how to set the switches for a particular frequency, and a chart showing what each bit/switch is in terms of frequency is included on the schematic. Basically all switches open provides 1280 MHz, and as more switches are connected to ground the frequency decreases. This is because the divide ratio determined by these switches decreases when a bit is set to zero or ground as opposed to open or a "1". The lowest possible frequency for stable operation is about 1220 MHz when the upper frequency of 1280 MHz is set by the MAR-8 trimmer cap for a control voltage of around +4 VDC. Be certain to consult the Amateur Radio Handbook for the proper freqency range to use for Amateur Operation (1246 to 1294 Mhz since the subcarrier on FM may be as high as 5.5 Mhz from the primary carrier frequency). The 5 Mhz crystal reference divide ratio can be changed with an on board set of switches, but it is recommended that it be set for a divide ratio of 2048 (RA1 grounded, RA0 and RA2 open) for proper operation as described here and in the schematic (It is also recommended that the upper bits N12 and N13 remain at ground, switches closed). As for the frequency to use for ATV operation consult with your local Amateur frequency coordinator group. One merely puts the anode of a diode from the pcb line going to the switch that needs to be connected to ground, and the cathode to the one of five channel lines to program in a channel. When the diodes of one channel line are grounded all appropriate switch lines for a particular frequency are grounded through the diodes establishing a particular frequency output from the synthesizer chip. A rotary switch can then be used to connect to the channel lines for convenient 5 channel switching by connecting the wiper of the rotary switch to ground, and the open terminals of the rotary switch to the channel lines. The board comes with any two channels programmed in at the manufacturer to the freqencies specified at the time of purchase if desired. The differential output of the MC145151 drives a LM258 OP amp from 0 to just over +10 volts. Stable loop operation is maintained within 0 to 4.5 VDC. The equations for the third order type 2 PLL integrator circuit using the LM258 is:

T1 = C1 x R1 0 db crossover
T2 = C1 x R2 lower corner frequency response
T3 = C2 x R2 upper corner frequency response

Substituting in the values used in the LM258 circuit yields:

T1 = 0.2 uf x 20K = .004 , 250 Hz
T2 = 0.2 uf x 680 Ohms = .000136 , 7.3 khz
T3 = 0.01 uf x 680 Ohms = .000006 , 147 khz

The loop response is then further low pass filtered with three .01 uf capacitors to ground in between the two 10 k resistors feeding the MC145151 chip. Even more low pass filtering was found to be

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ATVQ, 3 N. Court St., Crown Point,. IN 46307 PHONE MAIL: 219 662 6396
>>FAX 219 662 6991<< >>>> E-MAIL ATVQ@AOL.COM<<<<

necessary to eliminate the 5 Mhz reference lines from the video, and so a 100 ohm resistor was place in series with the LM 258 OP amp output with a .01 uf capacitor to ground. This is all of the filtering that could be done and maintain a stable loop design, and is not uncommon in designing these types of circuits. Thankfully it was enough to eliminate the reference frequencies from the video. The reference noise at the control voltage feedback applied to the MV2101 MAR=8 oscillator was observed on an oscilloscope to be below about 5 millivolts.

AUDIO AND VIDEO MODULATOR

There is nothing new here since this is basically the same design as used in the ATV=5. To summarize, a LM6361 Operational amplifier is used to mix the 4.5/5.5 Mhz switchable subcarrier into the video. The Op Amp is very linear and does not produce any significant intermod eliminating much of the lines that run through a picture when the subcarrier is off frequency. The Op Amp drives a linear HEX FET modulation transistor which modulates the output stage. If the output rf signal is then run into a linear Class AB brick the intermodulation effects are kept to a minimum. I have reduced the overall gain of the video Op Amp from a gain of 10 to a gain of 6.7. This increases the typical bandwidth of this stage from 3.5 Mhz to 5.25 Mhz. This will increase the amount of color burst and subcarrier injection level passed through the amplifier into the modulator moderately improving performance. In addition, 0.1 uf capacitors are paralleled with the 100 uf video coupling capacitors to increase the frequency response of the video input circuitry.

The LM1881 is used to strip the sync from the video. This sync is then summed back into the Op Amp with potentiometer R33. This allows the sync amplitude to be adjustable providing only needed sync stretching as well as a good square sync pulse. Some amount of sync stretching is usually necessary because of the difference in sync pulse height from various camcorders. Thus this circuit allows the user to adjust the height of the sync pulse at the output of the power amplifier for a proper video to sync ratio.

The Video +/= switch allows the user to invert the video. This is sometimes necessary when running FM depending on whether the receiver is using high side or low side injection.

There are two tuning caps associated with the audio subcarrier generator. C39 is set for a subcarrier frequency of 5.5 or 5.0 Mhz for FM TV operation. C39a is switched in by the associated slide switch, and the subcarrier frequency is then adjusted for 4.5 Mhz used for AM operation.

FINAL NOTES

This transmitter board can be purchased for $169.00 from:

ATV Electronics
16807 N. 46 TH Lane
Glendale, AZ 85306
PH. (602) 843-3585

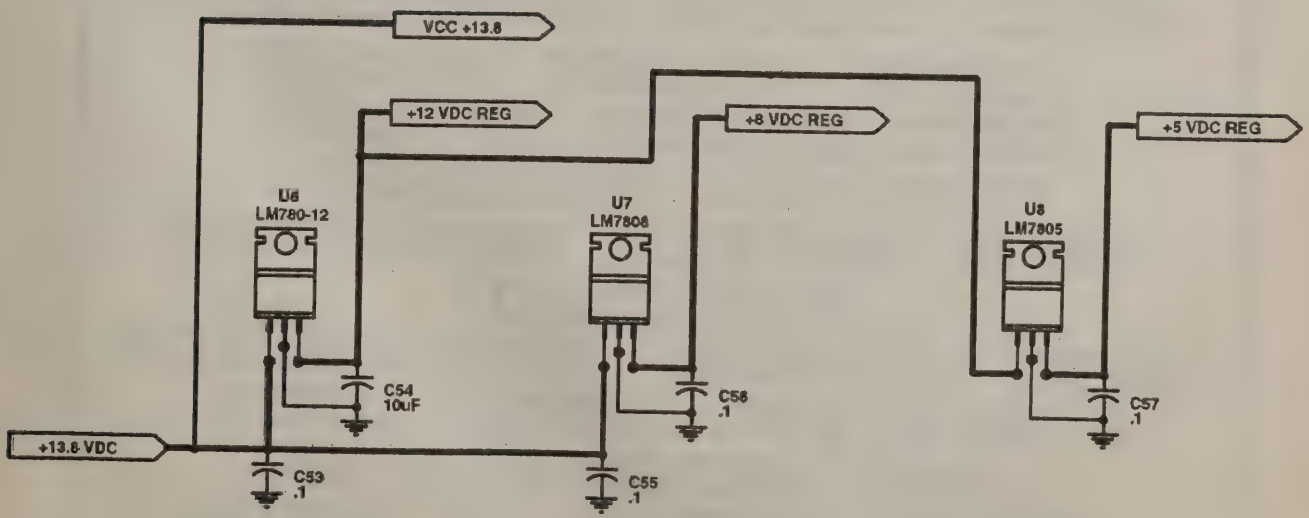
We also manufacture 1 Ghz downconverters, for $89.00 and other ATV products.

The EEZ MATCH Smith Chart program (Price is $99.00) for the PC is obtained from:

Besser Associates
Suite 210
4600 El Camino Real
Los Altos, CA 94022
(415) 949-3300

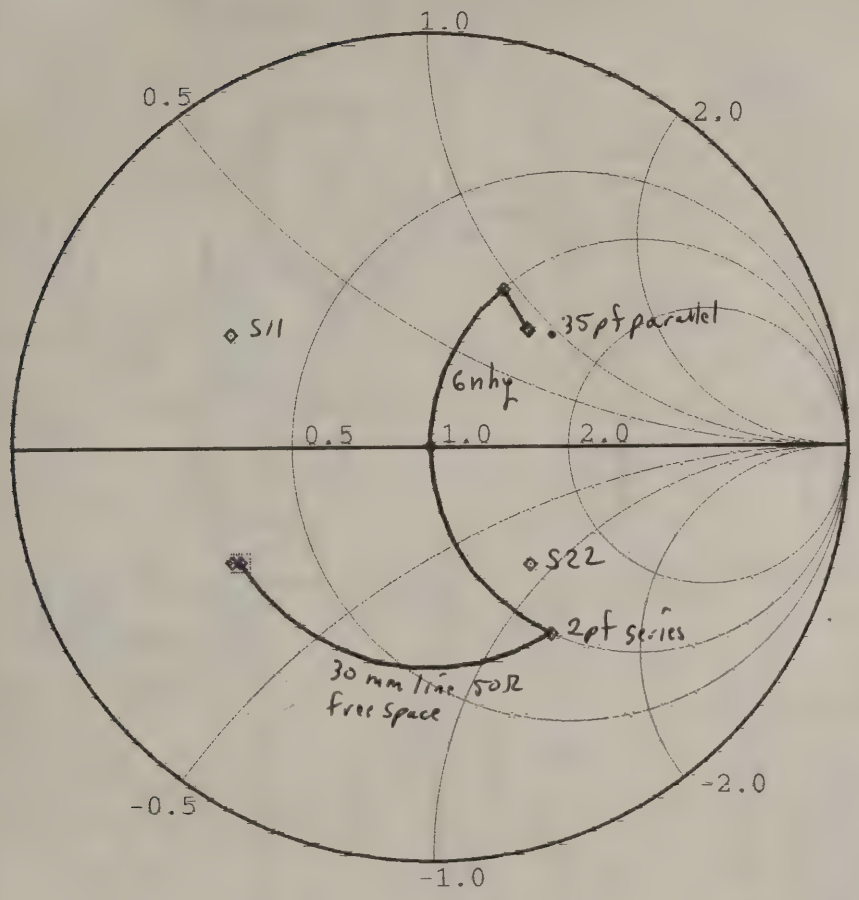
73's NT7L

POWER SUPPLY

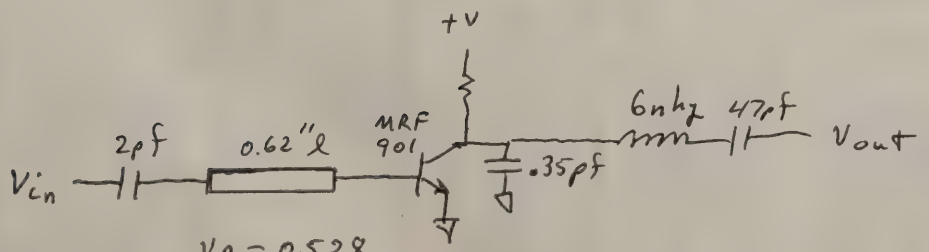


NOTE: INPUT POWER MUST BE AT LEAST 13.8 VDC
FOR +12 VDC REGULATOR TO WORK PROPERLY.

1200 MHz Transmitter

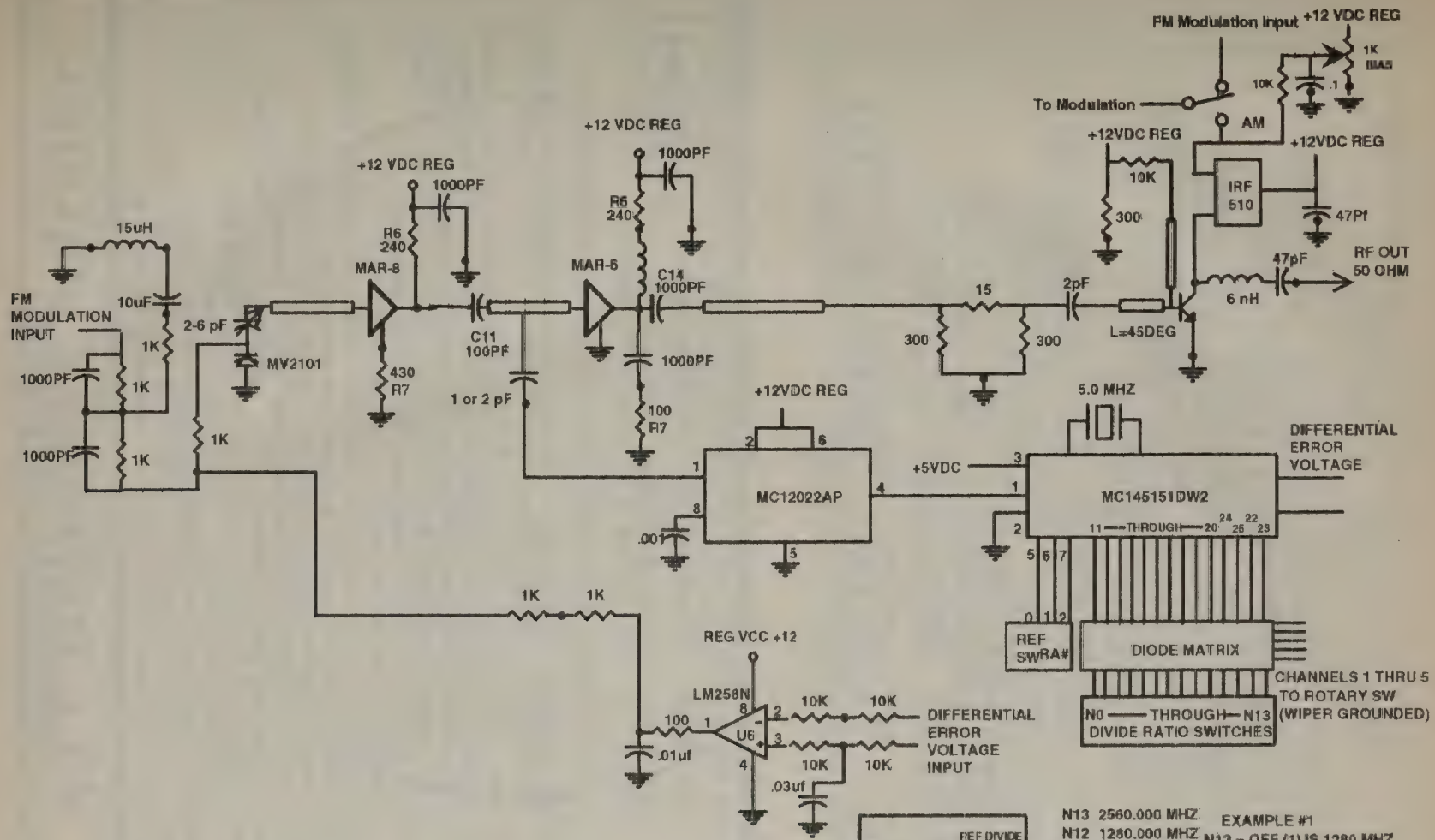


MRF 901 EEZMATCH DIAGRAM
(Besser Associates Program)



$V_p = 0.528$

$0.528 \times 30mm = 15.8mm = 0.62''$



RA2	RA1	RA0	REF DIVIDE RATIO
0	0	0	8
0	0	1	128
0	1	0	256
0	1	1	512
1	0	0	1024
1	0	1	2048
1	1	0	2410
1	1	1	8192

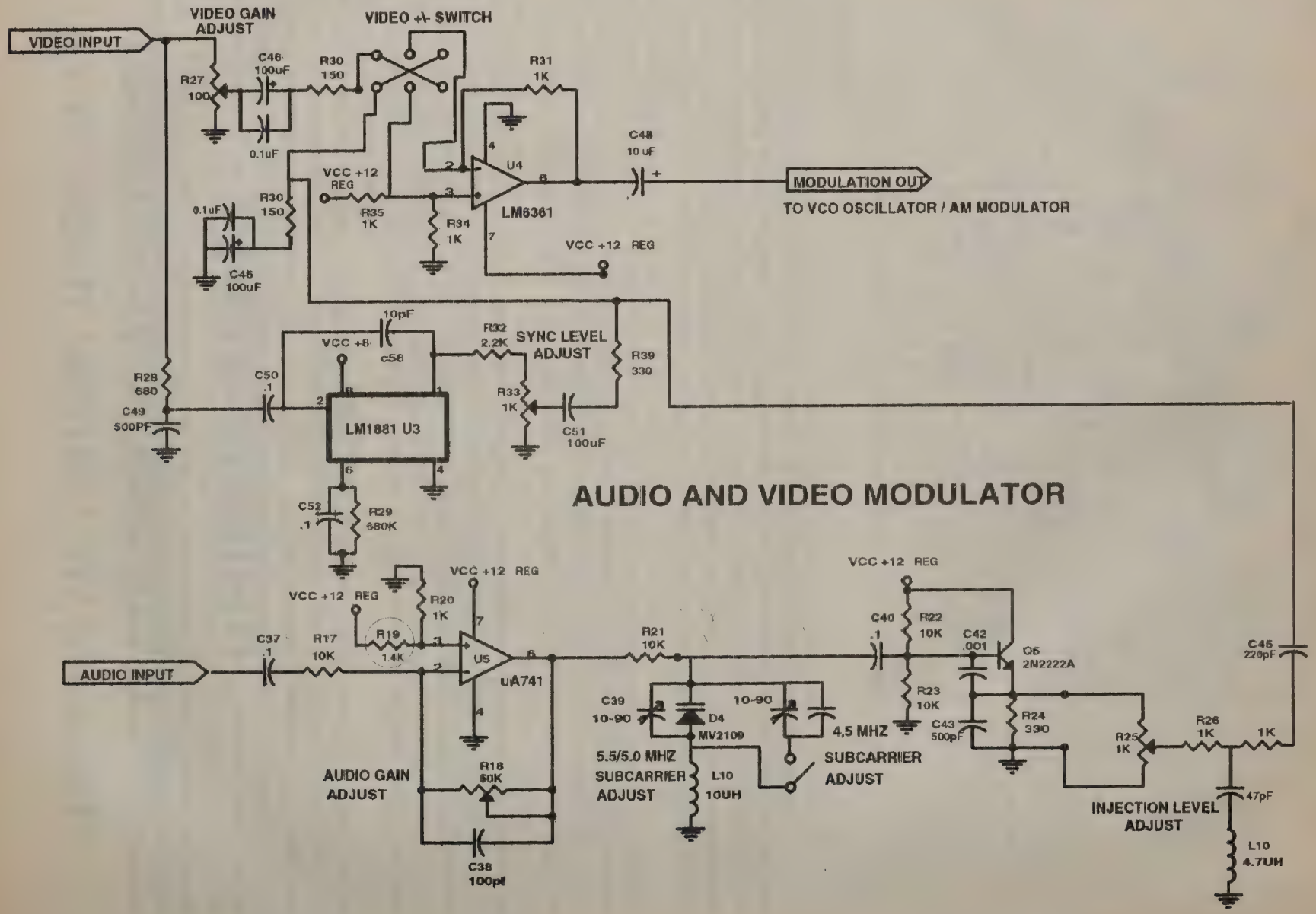
N13	2560.000 MHZ
N12	1280.000 MHZ
N11	640.000 MHZ
N10	320.000 MHZ
N9	160.000 MHZ
N8	80.000 MHZ
N7	40.000 MHZ
N6	20.000 MHZ
N5	10.000 MHZ
N4	5.000 MHZ
N3	2.500 MHZ
N2	1.250 MHZ
N1	.6250 MHZ
N0	.3125 MHZ

EXAMPLE #1
N12 = OFF (1) IS 1280 MHZ

EXAMPLE #2
N11,10,9,8,7,5,3,1=OFF(1) IS:
640+320+160+80+40+10+2.5
+.625
= 1253.125 MHZ

NOTE:
OPEN = OFF = 1
CLOSED = ON = DIODE = 0
GROUNDED

RF PHASE LOCK LOOP AND AMP


VIDEO INPUT
VIDEO GAIN ADJUST
VIDEO +\- SWITCH
R27 100
C46 100uF
0.1uF
R30 150
R31 1K
C48 10 uF
U4
LM6361
MODULATION OUT
TO VCO OSCILLATOR / AM MODULATOR
VCC +12 REG
R35 1K
R34 1K
C45 100uF
VCC +8
10pF
c58
R32 2.2K
SYNC LEVEL ADJUST
R39 330
R28 680
C49 500PF
C50 .1
LM1881 U3
R33 1K
C51 100uF
C52 .1
R29 680K
AUDIO AND VIDEO MODULATOR
AUDIO INPUT
C37 .1
R17 10K
R19 1.4K
R20 1K
U5
uA741
AUDIO GAIN ADJUST
R18 50K
C38 100pf
R21 10K
C39 10-90
D4 MV2109
10-90
4,5 MHZ
5.5/5.0 MHZ SUBCARRIER ADJUST
L10 10UH
SUBCARRIER ADJUST
C40 .1
R22 10K
R23 10K
C42 .001
C43 500pF
Q5 2N2222A
R24 330
R25 1K
C45 220pF
R26 1K
1K
47pF
INJECTION LEVEL ADJUST
L10 4.7UH

WEAK SIGNAL PROTECTION PROPOSAL

At the "Amateur Radio Politics and Junk Page" is a proposal from James S. Kaplan, (no call given) that proposes extensive protections for weak signal operation. The proposal is in response to the ARRL's continuing efforts to promote NFCC and its "Memorandum of Understanding" that supports the ARRL's created and funded SPOC/NFCC group which has vowed to take over all the VHF and UHF bands for FM mode repeaters only, and has published comments that were made public at the Tulsa hamfest that clearly state, "They won't know what has happened until it is too late to do anything about it." Of course we know MACC's public statements that ranged from "Uncoordinate all ATV repeaters by 2001, and its slightly modified, "strongly discourage ATV." In response to the continued silence despite several inquires by many to the ARRL as to their [ARRL] position on other mode protection/continuation, especially in the 70 cm band, the Weak Signal operators are banding together to put up another mode fence on all bands.

Currently, there is CW only portions on 6 and 2 meters. The WS proponents ask that the FCC set aside more weak signal space, namely, 50-50.1, 144.0-144.1, 222.0-222.25, 432.00-433.00, 435.00-438.00, 902.00-903.00, 1260.00-1270.00, 1295.00-1300.00, 2303.00-2305.00, 2400-2410, 2430-2438. Their claim is that these are the ARRL bandplan designated segments, and the continued "gentlemen's agreements are not enough in the face of the ARRL's NFCC sponsored activities, and therefore, FCC rules must be enacted in order to protect the WS turf.

The proposal notes that compared to ATV, Packet, FM and other systems [sic] weak signal, EME and satellite modes are a minority in the ham community yet the users provide valuable data on propagation, experimental techniques and new technologies and therefore should be afforded the special protection from incompatible modes that only an FCC rule would provide. They further state that the same modes above 13 cm are no longer incompatible.

Specifically noted is the incompatible nature of FM repeaters, yet the proponent expects to gain support from the ARRL/NFCC which is only interested in creating FM repeater only bands! The logic of that escapes me. The more troublesome part of this proposal is that it continues to inflame the range war between FM, spread spectrum, weak signal and other modes on the UHF-up bands, rather than to foster an all inclusive band plan where all modes can be enjoyed. Check it out for yourself at http://users.aol.com/kg7fu/wsfccbp.htm

73 Henry KB9FO

SOME GUYS HAVE AN EXPENSIVE LOOKING SHACK ON CAMERA--- I HUNG MY WIFE'S NEW MINK BEHIND ME

1996 TENTH ANNUAL ATV BANQUET

LITCHFIELD, ILLINOIS

11-30-96

With Christmas rapidly approaching and a Happy Thanksgiving just celebrated, the Central Illinois/St. Louis Area Amateur Television Club celebrated its tenth annual banquet. With good weather the dedicated group of ATV operators and their wives enjoyed another night of friendship and meeting new members. The banquet was held at the Ariston Restaurant in Litchfield which is the center point for the club with members coming from the Champaign, Bloomington, Salem, Peoria, Il. and St. Louis, Mo. areas. Larry Edwards WB9AUG came the farthest distance, Paoli, Ind. There were over 50 members attending.

Activities began at 5 PM with the Happy Hour and WB9QLY, Kathy Millick, registering the guests.

At 6:30 PM Scotty K9SM called the group to order and a prayer was offered by Cindy N9GNZ. A moment of silence was held for departed member Dave Williams WB0ZJP, an original member who passed on December 1995. After that the clatter of dishes glasses, and utensils and chit chat continued during the course of the meal.

The program portion began with the awards presentation. Recognition was given to those with new calls as a result of the vanity call sign program. Ron Pomatto KD9CN is now K9YY, Pete Visitin KF9FV is now W9TV (how's that for a call), Bill Hill KB9DU is now W9BH, and Jay Finn WD9ENR is now W9JF. Special certificates were presented to those with nine and eight years of attendance of the ten possible. Bill Hill W9BH, Cindy Hill N9GNZ, Bill Bryant K9KKL, and Mark Garrett KA9SZX were presented nine year attendance certificates. Jay Finn W9JF, Mark Osborn WA9SXK, Karen Osborn WB9OIN, and Ray Young K9RRP were given eight year attendance certificates.

The sixth annual Central Illinois/St. Louis Area ATV Operator of the Year was presented to Terry McCoy KA9BYB from Decatur, Il. Terry has been on ATV for several years and in addition to helping with keeping the local repeater going he is always around to help those who need it. He is active in the local Decatur club and always seen at the local hamfests.

Mark Garrett KA9SZX provided a video tape program on a balloon launch that he attended in Indiana. He was on the fox hunting team and showed tape of the lift off, balloon burst and the remains in a corn field.

The prize portion was next with the famous double draw and a new method of awarding prizes, heads and tails, which provided a lot of fun and laughter.

With all the prizes passed out farewells were said and everyone made their way home with the next banquet scheduled for November 29, 1997.

The above information is dated 12-17-96. Further information or questions should be directed to:

Central Illinois/St.Louis Area ATV Club
Scott Millick K9SM
907 Big Four Ave.
Hillsboro, Illinois 62049

217 532-3837

This press release is being distributed to those listed below .

ATVQ
CQ Magazine
QST Magazine

Enclosed Photos

#1 Central Illinois/St. Louis Area ATV Operator of the Year Terry McCoy KA9BYB showing his plaque and traveling plaque

#2 Mark Garrett KA9SZX who presented the balloon program

#3 Banquet scene with those remaining playing the heads and tails game

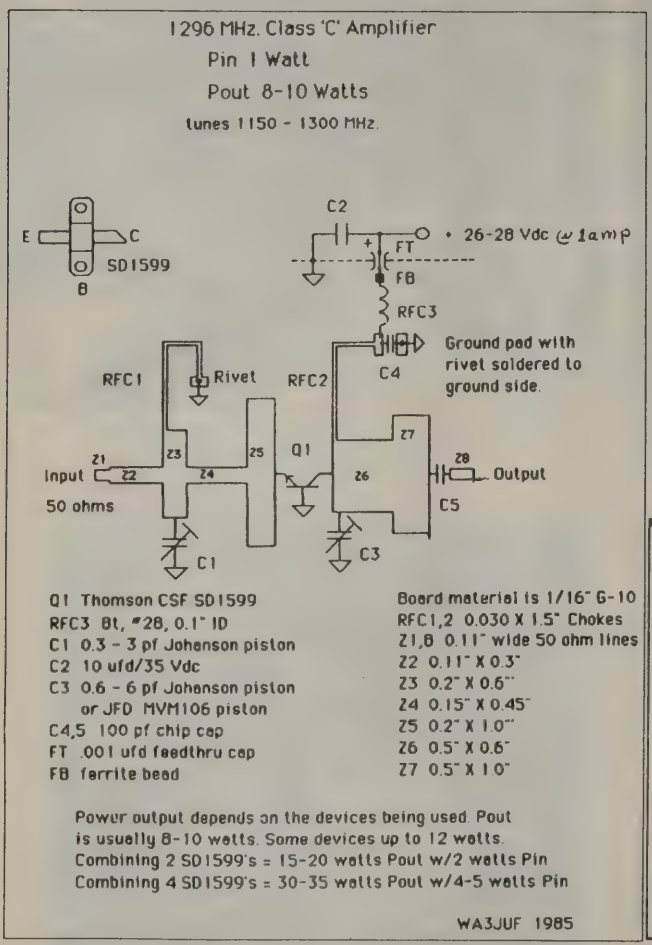
#4 KA9SZX Mark Garrett, W9BH Bill Hill, and K9KKL Bill Bryant accepting the 9 out of 10 Year Attendance Award

All Left to Right

Photos by Scott K9SM

ATCO NEWSLETTER HIGHLIGHTS

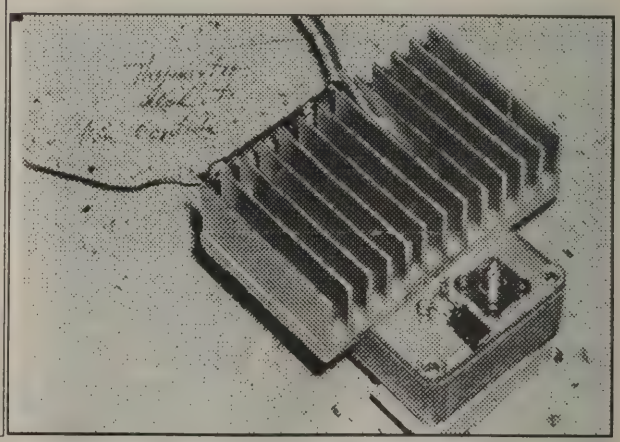
BUILD A 1200 MHz TRANSISTOR AMPLIFIER



Here's a simple 1200 MHz amplifier circuit that was sent to me from Ed Walker in Mountain City, Tennessee. It looks like a good circuit to try in lieu of a conventional "brick amplifier".

Ed says...."I have built all of the amps thatWA3JUF has designed and they all tune up smoothly with good input return loss. RF gain Co. has this transistor for about $25. The secret of this device is the 28 volts. You could not get this gain with 12 volts."

I noticed that the amplifier is a class "C" device which is OK for our ATV signals as they are FM modulated signals but don't try to use this for AM ATV. The picture below shows the outside view of the amplifier in an aluminum die cast box with a large heat sink mounted to the top. The leads at the top are thermister leads for temperature control and the lead at the top left is the 28 VDC power.



DAYTON 97
SATURDAY AGENDA

Room 3, 2:45-5:00 FASC SCAN TV
Moderators: Bill Parker W8DMR, Bill Brown WB8ELK

Presentations: Hawaii to California ATV Mike Henkowski KC6CCC
ATV Fromt he Edge of Space: Balloons and Rockets Bill Brown WB8ELK
10 GHz Radiation Phenomina Demonstration Dr. John Kraus W8JK Cygnus-Quaser Books

ATCO NEWSLETTER HIGHLIGHTS

900/1200 Mhz ANTENNAS....TRY THESE WITH THE REPEATER!

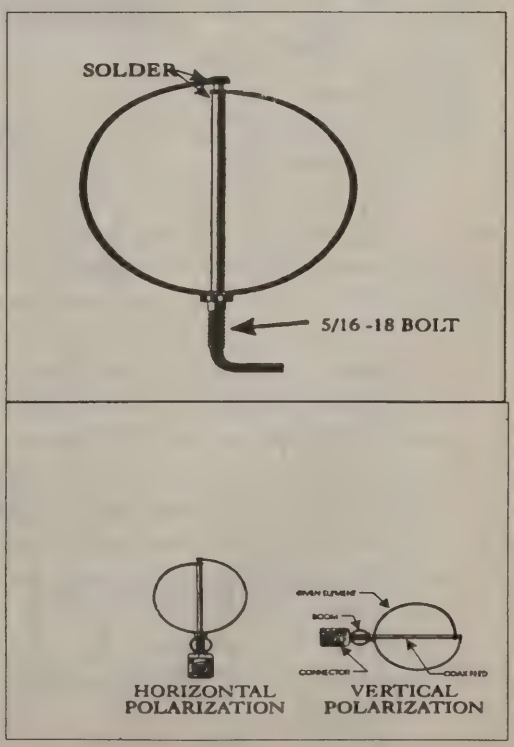
Ted Post N8KQN has come up with these two similar loop yagi designs that are easy and straight forward to build, do not take a lot of time and won't overload your tower. If used for the ATCO repeater, they can be side mounted on the tower with a fixed position toward downtown Columbus so they won't have to be integrated into your obviously overly complex arrangement of existing antenna/rotor combinations. Ed is so excited about these designs that the word is out that he would even volunteer to come out to your place and put it up for you! Contact Ed soon because I understand that his free time is extremely limited.

These antennas are nothing revolutionary as far as gain is concerned but fair quite well considering the number of elements involved. Besides, a dish or quad arrangement of 50 element yagis is NOT needed to work ATV through our repeater. Simple easy to find materials at most hardware stores is used. (If anyone building these has trouble finding materials or needs further details, check into the Tuesday night net on 147.45!).

REF and DIR elements are 3/8 wide x 1/32 thick aluminum. Drill a 1/8 hole 1/4 from each end. Mount to mast with 4-40 stainless hardware. The DE element is the same as for REF/DIR except it's brass with an additional hole in the center for the 5/16 bolt and coax to pass through. Use a 5/16-18 brass bolt with a 1/4 dia hole through its middle to mount this element . The coax runs through the hole.

* NOTE: the 1250 MHz antenna element spacing 5" dimension for REF1 leaves enough room for a clamp assuming an end mount to the tower (mast) will be used here.

	Distance from end of boom		Element length	
Element	910 MHz	1250 MHz	910 MHz	1250 MHz
REF1	0.50	5.00*	14.17	10.62
REF2	4.45	8.12	14.17	10.62
DE	6.32	9.12	13.55	10.12
DIR01	7.92	10.19	12.16	9.38
DIR02	9.12	11.06	12.16	9.25
DIR03	11.68	12.78	12.16	9.25
DIR04	14.23	14.62	12.16	9.25
DIR05	16.03	15.87	12.16	9.19
DIR06	19.35	18.12	12.16	9.19
DIR07	24.44	21.25	12.16	9.19
DIR08	29.58	25.25	12.16	8.87
DIR09	34.69	27.87	12.16	8.87
DIR10	39.81	32.38	12.16	8.87
DIR11	44.92	36.00	12.16	8.87
DIR12	50.04	39.50	11.81	8.87
DIR13	55.15	43.00	11.81	8.87
DIR14	60.27	46.50	11.81	8.87
DIR15	65.38	49.50	11.81	8.87
DIR16	70.50	53.00	11.81	8.87
DIR17	75.61	56.50	11.81	8.87
DIR18	80.73	60.00	11.81	8.87
DIR19	85.84	63.50	11.81	8.87
DIR20	90.98	67.00	11.81	8.87



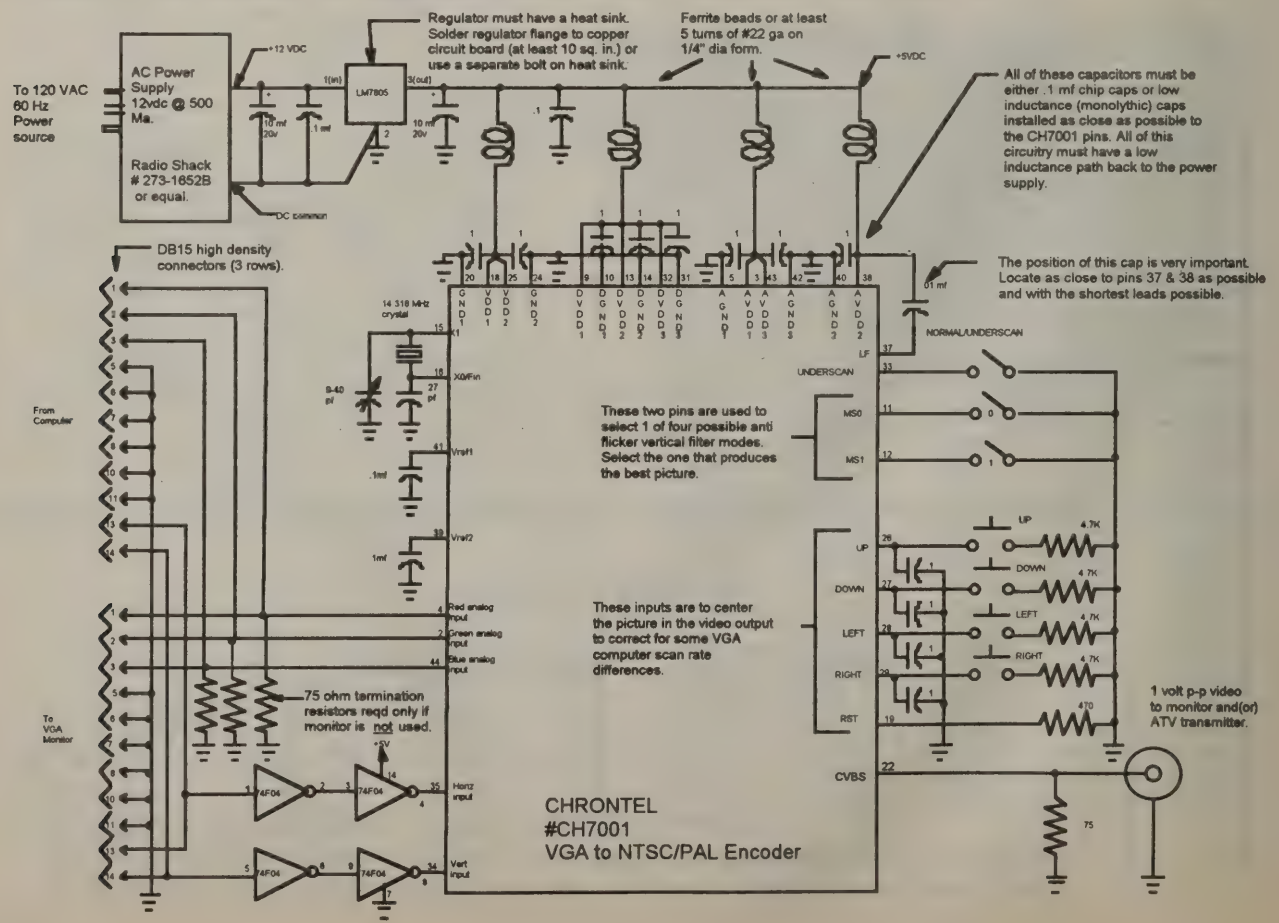
ATCO NEWSLETTER HIGHLIGHTS

BUILD A VGA TO NTSC CONVERTER FOR YOUR COMPUTER

Here is something that I've been working on for a couple of months. It looks like it has promise for use with the computer to convert the VGA video signal that goes to the computer monitor to NTSC video so it can be transmitted through the ATV transmitter. All circuitry is outside of the computer so no internal card or special software is needed. Simply plug this circuit into the VGA computer connector and plug the computer monitor into this circuit. The computer monitor is still useable while the circuit is connected. If that isn't enough, the converted video has resolution superior to many of the store bought units.

The heart of the design is a single chip converter that accepts the computer VGA red, blue, green, horizontal sync and vertical sync signals directly and outputs a high quality 1 volt NTSC composite video (in fact S video and PAL outputs are also available). The chip is made by Chrontel and costs about $25.00. Sound good? There IS a down side for the average constructor however. First, it's only available as a PLCC surface mount chip. Second, since there are high speed analog to digital conversions going on inside, circuit layout is very critical - especially the power supply leads. Very short direct wiring is dictated and proper bypassing with low inductance capacitors is dictated. It's very easy to mix the ground currents of the digital circuitry with the sensitive analog inputs. In operation the analog RGB input signals are digitized on a pixel by pixel basis by three 8 bit video a/d converters for 24 bits/pixel processing producing up to 16 million colors. The digitized RGB inputs are fed to a block where scan rate conversion and programmable 3 line filtering is performed. The vertical filter eliminates flicker at the output while the scan rate converter converts the VGA horizontal scan rate to NTSC or PAL scan rates.

To help overcome the difficulty of reproducing this circuit, I am working on a printed circuit board but it's not finished yet. If there is enough interest, I'll finish it and make it available to anyone interested. I present the circuit here only to demonstrate the simplicity of the design and see if there is enough interest for me to continue. The manufacturer does have "evaluation" circuit boards that he said could be purchased. I've not asked price but will follow up if needed. The IC is not available through any distribution-only direct from the manufacturer and they are not willing to accept individual orders. However, the marketing manager is a ham and understands so he will work with us if we would buy greater than single quantity devices. I'll have to wait and see who is interested.



If video is an AC signal, where does the DC come from?

THE NATURE OF VIDEO (part 2)

by Henry KB9FO

It seems the most perplexing aspect of video modulation and transmission is that video has both AC and DC components. The AC portion is easy to see, the DC portion is a little less obvious. When I wrote the NATURE OF VIDEO a couple issues back, I had to decide if each topic should be brief and concise, a "this is the important stuff" or if I should include a lot of the supporting theory behind each. I opted for the simple explanations so it would fit! So here is a little more detail on a couple of topics from the first segment. Video modulation is unlike any other mode in a couple of distinctive ways. Besides being composed of higher frequencies (up to 5 MHz, even more if you use some computer graphics or character generator) the modulation is applied in a different manner and the modulation itself is a strange animal if we compare it to analog voice AM modulation.

Fourier analysis would project that any complex waveform can be defined as a combination of sine waves, of various harmonically related frequencies. Rather than get into a lengthy discussion of math, which readers tell me turns them off, here is a practical example. Start with a simple sine wave. Pick one, any one. Draw it out on paper so we can visualize it. Now on a second sheet, draw the second and third harmonic of the first sine wave, using the same scale. [Fig. 1]

Now cut the pieces apart so and lay each over the other so we can see all three at the same time (by holding them up to a light). Besides three sine waves, we should also be able to trace out the additive function of the shapes which now begins to look like a worm, or soft rectangle. If we ignore the bumps, and draw a line across the tops of all the bumps and the bottom of all the bumps, the rectangle takes on more shape. If we add mode harmonics we would begin to fill in the dips and smooth out the valleys, and the start and stop points would become more vertical. IE, a 20th harmonic would have a very steep beginning and ending waveform. [Figure 2]

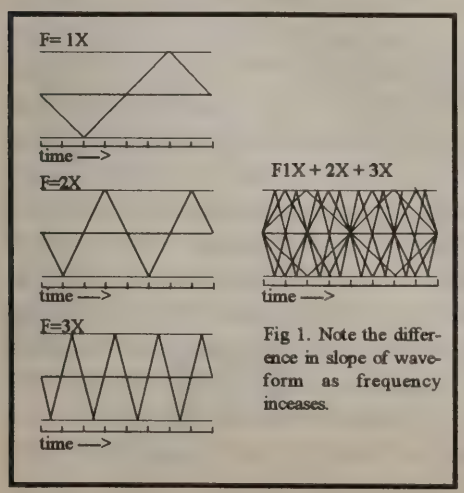


Fig 1. Note the difference in slope of waveform as frequency inceases.

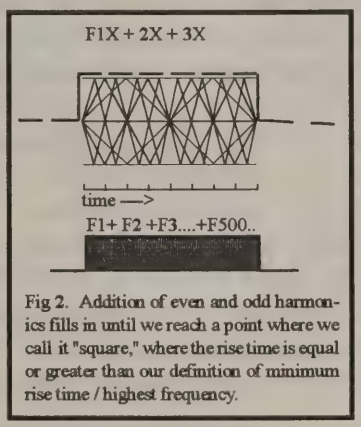


Fig 2. Addition of even and odd harmonics fills in until we reach a point where we call it "square," where the rise time is equal or greater than our definition of minimum rise time / highest frequency.

What we call a square wave, is really never square since a signal cannot instantly go from a zero state to some voltage state (say one volt). There is always a rise time. This rise time can be defined in either frequency or time domains. That is, it can be said the waveform has a rise time of 1 microsecond, or it has a rise time of 1 Megahertz. Either defines the slope of the waveform as going from zero to one volt in a particular way. In video, for the NTSC system, the maximum modulation frequency is defined as 4.5 MHz. So the maximum SINE WAVE modulation would be a signal of 4.5 MHz, or roughly .2 microseconds also known as 200 nanoseconds. This is also known as the aperture limit or Nyquist limit of modulation. A square wave of 4.5 MHz could not be passed since to be a "square" wave, it must by definition, have frequency components above 4.5 MHz. In fact the highest practical "square wave" in video is about 1 MHz, depending on how round we are willing to have the corners. This is also the defined rise time for all pulses used in transmissible video. Rise time is defined as the time it takes for the signal to go from 10% to 90% of the difference between the two voltage

THE NATURE OF VIDEO (part 2)

points. For example, going from zero to one volt, the rise time would be measured from where the signal passes from the .1 volt point to the .9 volt point. This eliminates the confusion of where does the "knee" start or end. [Fig. 2]

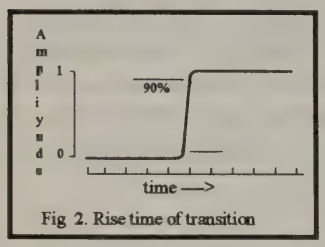


Fig. 2. Rise time of transition

Now in video, there are also two frequencies generated for each video element. A video element is any transition in level. This could be from blanking to sync pulse, or from blanking to white, or from 50% white to 51% white. The amplitude of the transition, determines how much energy will be in the sideband it generates, which is separate from the frequency of the sideband it generates. If we modulate a normal carrier wave with a sine wave, on a spectrum analyzer you would see three blips. The center being the carrier wave frequency. On each side would be a blip which represents the original modulating frequency. If we had a 1 KHz modulating signal and a carrier wave of 1 MHz, we would see the blips at 999,000 Hz, 1,000,000 Hz and 1,001,000 Hz. This is fine for audio, because there is but a single frequency/time component to the modulation. In video, there is second aspect. [Fig. 4]

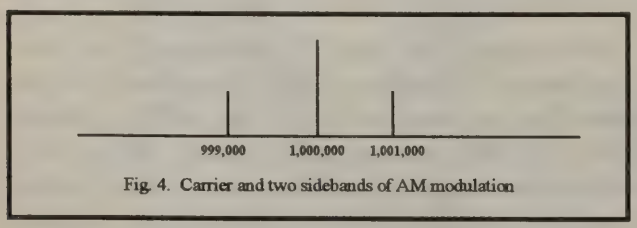


Fig. 4. Carrier and two sidebands of AM modulation

All video is a repetitive waveform, because of the scanning of the image, the same transition will be "seen" each time the scanning gets to that particular location. For simplicity, lets use a picture with a single white vertical line on the screen. The remainder of the video is black. Each time the scan system bumps into the white line, it will generate the sideband that represents the frequency of the slope of the transition from black to white and back again. Since the white line is vertical, it will be "seen" on every scan line, 262 1/2 times per field, (minus the vertical sync period) or about 241 times, which, because we use interlace scanning, is 482 times per frame (two fields) x thirty times per second, or 14,460 times per second. We add back the vertical interval time, which is just a temporary lapse of video, and we have a time between "bumps" of about 65 microseconds, or 15,734 Hz. This is the same for any transition we care to identify. So asecond sideband is generated at 15,734 Hz, and multiples (harmonics) as well as the frequency of the slope (say 4.5 MHz) of the transition. If the transition is large, the energy in the sideband will be large, and if the transition is small, the energy of the sideband will be small.

If we rotate the line so it runs diagonally, we will get the same results, since the scan rate determines the first sideband component, and the slope of the transition determines the second sideband component. All the sidebands will exist at multiples of the scan rates, 30, 60 and 15,745 Hz! These sidebands exist instantaneously and simultaneously. So the amplifier has to produce a power bandwidth of 4.5 MHz (9 MHz at the amplifier device, part of which will be thrown away in the sideband filter later). The video low pass filter will remove signal above the 4.5 MHz cutoff frequency used for NTSC video. If there is a sound subcarrier, it will also exist at the same instant, and if the line is colored, not just white, there will be color sidebands generated too. Even the most simple video element generates a considerable amount of information in the modulation process.

In audio, the modulation is symmetrical. For the most part, if you divide the signal into positive and negative portions, they would cancel out to zero. The resting state of the signal is zero volts. If you look at audio on an oscilloscope, you will note that the little green worm tends to stay wherever the centering control (vertical position) put it, and the audio waveform is a series of wiggles above and below this zero voltage reference. There are both positive and negative parts of the waveform, and the center of this is zero volt. Not so video. Video waveforms go from zero to one volt. Our little green worm will dance up and down in response to the average DC level (ac coupled scope). In baseband this is usually zero volt for sync and one volt for white. In the TV transmitter this is inverted so that one volt = sync level, .714 volts = blanking and .1 volt = white. [Fig. 5]

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THE NATURE OF VIDEO (part 2)

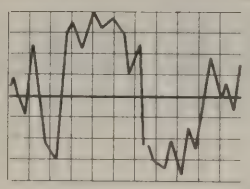
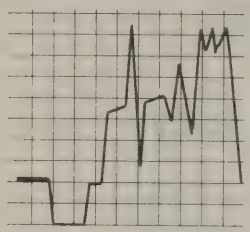


Fig. 5. Audio waveform, centers around 0 volt center line, and is generally symmetrical over time.

Audio

Typical Scope display

Video



Video waveform is either white or sync referenced to 0 volts, and is not symmetrical.

In order to maintain the black and white levels and sync levels to precise values, both the transmitter and receiver have circuits, called clamp or DC restorer, which force the signal to be at a particular level for various reasons. First, we want the transmitter to always be at maximum power only during sync pulses. Second, we want a constant black level, so the picture contrast ratio stays the same. And we want to limit the white levels so that we never have a zero carrier (over modulation) state. The values of these are precise voltages. At the one volt standard video signal, we divide the signal into 140 units. These are called IRE or IEEE units. 40 are used for sync and 100 are used for video. Another 20 units of bias are used in commercial broadcast transmitters for the level between TV white and absolute minimum carrier.

For the 140 unit signal, there are 40/140 volts of sync and 100/140 volts of video, or .286 volts of sync, and .714 volts of video. The sync portion is constant. There should be no variation in the level set for sync and blanking. (Blanking is the "zero"or black reference for video). In the transmitter, the power is held to 100% power for the sync pulses, and 56% power for the blanking level. The video can be at any level from 55% to 5% power. Remember, in the broadcast transmitter, we added 20 units to make sure white never produces zero carrier. So the sync is 160 of 160 units = 1= 100%, blanking is 120 of 160 units = 75% (voltage), and white is 20 of 160 units = 12.5% (voltage). Because there are two functions, sync and video, and the sync is constant and the video is not constant, the video modulating instantaneous voltage level will be any value between 100% and 12.5%, and for any period in excess of one line the average voltage will be between 75% and 15%. By keeping the blanking level constant, the two portions of the signal, that above and that below .714 volts will never cancel out to zero, so for a constant black level on your TV set, we cannot rely on the "zero" value we had in audio, but have a DC level. There will always be a generated average bias voltage, which represents the average picture power in any one line, frame or field. This is the DC component generated by the video signal. The DC level is at its highest during vertical sync, when the transmitter is generating 100% power for the greatest period of time, and it is lowest during an all white picture, where the transmitter is generating 100% power for 5 microseconds, 56% power for another 6-8 microseconds, and 10% power for about 45 microseconds. During vertical sync, the average power is about 92% and during video, about 33% average power. It will change with picture content! The only time the apparent DC level is zero is when the transmitter rests at a constant power level. There is a time constant involved, so the DC level is actually always changing except under static, test signal conditions. The negative only modulation voltage also means that there is a DC component to the video signal, since it always offset (biased) from zero volts, and there is never a corresponding "positive" modulation voltage.

Note that in the transmitter we DC bias the signal by about .1 volts so that the white level can never achieve zero carrier. Otherwise the one volt signal would clip the carrier when there were 100 IRE white levels (or more) causing splatter, sync buzz, loss of aural carrier recovery and other nasty things. This leaves a little modulation room between peak white and zero carrier level. Thus, a minimum of 10-12% carrier power is always present. Sound is detected by what is called intercarrier demodulation. Rather than directly recover audio from the FM carrier, which would require a separate IF amplifier and detector (as was used in the early days of TV) the sound is detected as the difference in frequency betweenthe video and sound carriers. If there is no video carrier, there is no sound detection!

THE NATURE OF VIDEO (part 2)

In the old days, TV receivers lacked the DC restorer circuit (typically just a diode) and it was not uncommon to see the retrace lines during bright scenes, when the picture tube would be biased by the DC component of the video to a point above blanking (extinguishment) and when the picture was very dark, it was REALLY dark.

Now to add to all this, is the vestigial sideband filtering. If receivers centered the carrier in the IF passband, and we transmitted both sets of sidebands equally, (upper and lower) we would have no differential between the sideband power for low frequency and high frequency modulations. But video as any AM signal is redundant between the upper and lower sidebands. They start out identical. But when we look at the energy of the sidebands, we find that the low frequency modulation components are quite strong, and the high frequency components are very weak. This means nearly all the sideband power is very near the carrier frequency and very little is in the areas of the spectrum away from the carrier. In fact, nearly 95% of the video sideband power falls within the first 1 MHz.

If we were to remove one entire set of sidebands, we would also remove a considerable amount of the DC signal, and the low frequency response would be quite poor, resulting is smearing and blurring of the video. But if we only remove a part of one sideband, we keep a faithful representation of the video and the DC voltage generated. The small error, typically less than 3% is not discernible and can be equalized in the transmitter circuits. But it also means we have cut the power of the higher sidebands in half, since we threw half away in the vestigial sideband filtering process. So the receiver IF is tuned such that the high frequencies are fully within the passband, and the carrier and low frequencies are on a slope of the IF filter, so that the carrier is at the 50% level. (- 3 dB power) This equalizes the sideband power. When we tune our ATV receivers, this causes a curious effect. [Fig. 6]

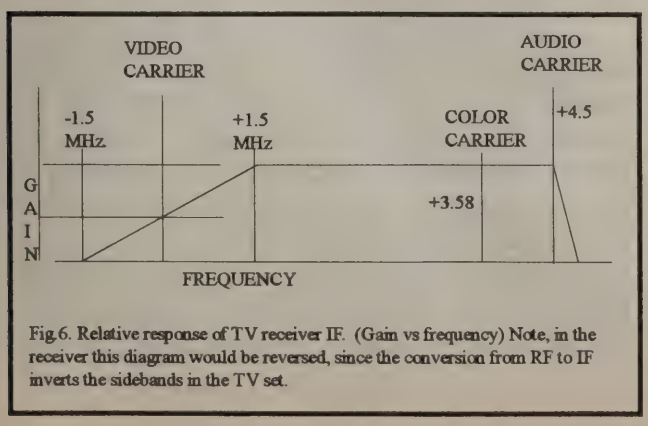


Fig.6. Relative response of TV receiver IF. (Gain vs frequency) Note, in the receiver this diagram would be reversed, since the conversion from RF to IF inverts the sidebands in the TV set.

If we tune the receiver for maximum picture, we have shifted the incoming carrier to the center of the IF passband, so that we fully recover the low frequency sidebands which would otherwise be 3 dB down. To accomplish this, we have shifted the video carrier within the IF passband by about 1.5 to 2.5 MHz (remember we are looking at a 6 MHz wide channel and IF). Where is the sound? It's gone! Which is why on weak signals we can tune our ATV receiver and get PICTURE OR SOUND BUT NOT BOTH! The 4.5 MHz subcarrier is now above the passband of the IF and has been cut off by the IF filter! This is one reason the sound "disappears" long before the video. Its like using the IF shift on an HF SSB receiver, to shift an interfering signal out of the passband and eliminate it. [Fig. 7]

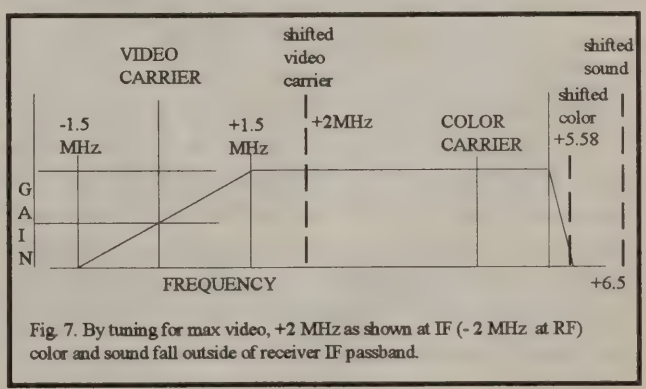


Fig. 7. By tuning for max video, +2 MHz as shown at IF (- 2 MHz at RF) color and sound fall outside of receiver IF passband.

Commercial TV stations use audio carrier levels of -7dBc to -15 dBc (a 5% to 20% of video carrier power) So the aural carrier is much stronger than a typical ATV transmitter which uses a subcarrier level of not more than -15 dBc (dBc means dB relative to the video carrier). IE, a commercial station could be using five million watts of video PEP and one million watts of audio while we use 100 watts of video and three watts of audio which after VSB filtering is 1.5 watts of audio! So now you know where the audio went! For better audio, use a separate transmitter or a second band IE two meters

THE NATURE OF VIDEO (part 2)

144.34 for audio with video on 70 cm, 439.250 MHz. Likewise, our 100 watt video signal with its "handy-talkie" audio signal is not likely to bother anyone!

But, you say, when I look at a waveform on the oscilloscope, the color is more than one volt. Not so my friends. The oscilloscope is a simple voltage measuring device. It cannot separate (without filtering) the various components of the TV signal by frequency. A waveform monitor is a specialized type of oscilloscope, that is equipped with filters to allow us to look at the luminance, chroma or both parts of the signal. In "flat" response, the same as an unfiltered oscilloscope, the display adds the chroma signals to the luminance signals. In truth, the chroma signals are completely independent of the luminance as they are a subcarrier modulation. To be more accurate there are two subcarriers and they are each modulated as double sideband, suppressed carrier. A balanced modulator takes the signal and makes it DSBSC so only the sidebands remain. The two components of the color signal, I and Q (for In phase and Quadature phase, meaning 90 degrees difference) (also called R-Y and B-Y) have two components. The amplitude of the color signals represents the saturation, and the phase of the color signals represents the color hue. In genuine NTSC there is also a difference in bandwidth, one being 1.5 MHz the other being .5 MHz, which in cheap equipment is reduced to .5 MHz. for both, tossing out the higher frequency color components (picture detail). The color subcarrier, 3.579545 MHz (called 3.58 for short) was chosen so that the color sidebands fit in between the luminance sidebands. With this, two things happen, first, we can separate the Y (luminance) and C (chroma) signals using a frequency comb filter, and second, since the sidebands are never on the same frequency, there is no direct additive effect. They both exist at the same time, but never at the same frequency. For those on the PAL system, the color carrier is about 4.43 MHz and there are two "burst" signals, called U and V, for Unvarying and Varying. There is also a transmission system with a mixture of 625/50 scan rates and 3.58 color but it is seldom used.

So on your voltage scope, you may observe a highly saturated color signal as appearing to be 1.5 volts peak to peak(P-P) but in fact only one volt (or less) is luminance, and the remainder is color. Now since the color signals are suppressed carrier signals (sort of like SSB audio) we need to insert a small amount of carrier at the receiver to recover the signals a BFO (beat frequency oscillator) of sorts. We also need to be able to lock the receiver oscillator so that we recover the correct phase and amplitude so the color is stable. This is where the burst signal comes in. At the back porch of sync (the area after the horizontal sync pulse and before the beginning of the picture) we insert nine cycles of the original 3.58 carrier. This is enough so that when it is recovered at the TV set, the local 3.58 oscillator is phase locked to the original carrier and we can demodulate the signals with the receiver generated continuous 3.58 carrier signal. PAL system readers, just replace 3.58 with 4.43.

The amplitude of the burst signal is also used. The color detector circuits adjust their gain (color intensity) inversely to the color burst amplitude. The normal level of the burst signal is 40 IEEE units (.286 volts) the same amplitude as the sync pulse! By comparing both, we can decide if the burst is lower or higher than the normal level. If the burst signal is low, the circuits add more gain (turn up the color) to compensate. If the burst is higher, the circuits reduce the gain (turn down the color) to compensate. This keeps the color intensity from changing even though the signal strength of the TV signal is changing. Without this action, a fixed reference, the color would change intensity with the strength of the received signal. Viewers near the transmitter would have overly saturated color, and distant viewers would have little if any color.

OK, but why does my watt meter go down when I turn up the video gain control of my transmitter, aren't I losing power? And why doesn't it ever go up like my AM transmitter does when I speak in the mic?

No. the power is not changed, only the detected average power has changed. Remember back to the start, I mentioned that normal AM voice modulation is symmetrical. There are positive and negative voltages generated with a zero volt starting point. So when you add the voice signal to a carrier wave, you have both positive and negative voltages being added to a steady CW waveform. The result is part of the time the signal is audio + carrier and part of the time the signal is audio - carrier. The sidebands are additive on the wattmeter, so you see

THE NATURE OF VIDEO (part 2)

100 watts of carrier with up to plus fifty watts of audio. When you talk, the watt meter, a voltage sensing device as the oscilloscope, moves up to show the increase in additive signals. [Fig. 8]

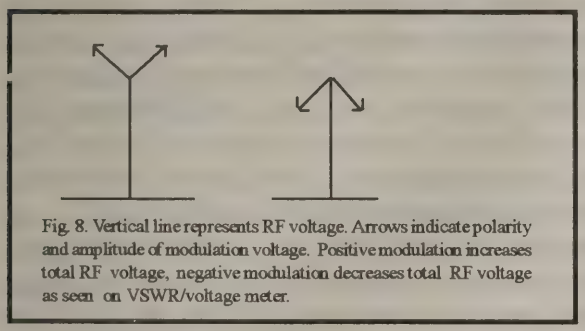


Fig. 8. Vertical line represents RF voltage. Arrows indicate polarity and amplitude of modulation voltage. Positive modulation increases total RF voltage, negative modulation decreases total RF voltage as seen on VSWR/voltage meter.

In video, the signal has only positive voltages (sync is zero volt) in baseband signals, which is inverted in the transmitter to negative only voltages. The zero volt sync signal is still zero volts, so the carrier plus sync still = 100 watts, we have 100 watts of carrier and zero watts of modulation. When the video signal goes to blanking (black) level, we have an -.286 volts added to the carrier, so we have 100 watts minus the power of the negative sidebands, so we have less than 100 watts, or about sixty-five watts average power. When we add the white portion of the video, we have the negative .9 volts, added to the carrier power, or 100 watts minus the white power sidebands, or about ten - fifteen watts. So your watt meter senses the positive carrier voltage and the negative video voltage and says you have (on average) about twenty - thirty watts. There are never any positive going voltages so the meter can never go up (carrier plus positive modulation). Your peak power is unchanged, it is still 100 watts, but the watt meter is an average responding device, so it is showing the average power or APL (average picture level).

Keep in mind that we want to limit the white video levels so that we never have less than 10% power, which leaves room for the audio subcarrier wave at 4.5 MHz. At the receiver the video carrier is used to "beat" against the FM carrier at 4.5 MHz. The difference frequency is the recovered audio. Unlike the color signals, the sound signal has a carrier, and so it "rides" on top of the video carrier in a voltage or power sense.

If you use separate transmitters, thus separate carrier waves we can run our video transmitter at full output and sync will equal 100% power. If we mix the sound with the video (called multiplexing) then we need to have some reserve power for the audio carrier, so sync should be 90% power of our amplifier, and the sound takes up the remaining 10%. In commercial TV we might get 60 KW from a single tube in "vision only" service, but have to operate at 40 KW for combined, audio/video, service. Most hams use the multiplexed method since it means much simpler designs. A few hams will operate separate transmitter for sound and video, and either combine them at the transmitter output, or (rarely) use two antennas and let the signals "mix in the ether."

Using the multiplex system also has some drawbacks. Intermodulation products can creep into the signal since it is not likely we are using a class A RF amplifier. We use a "brick" class C or poor class AB amplifier with two coax connectors, black heat sink fins and two power leads, red/black, exiting the box. When the carriers mix, (color, sound and video) we can get a triple beat. No, not a new rock rhythm, but an interference in the picture from a 928 KHz signal that is generated by the intermod of the amplifier. To minimize this, we use less than full audio power level, and use an audio carrier that is 15 dB below the video carrier, (noted as -15 dBc) or even a little less.

So when choosing a transmitter, make sure it has an adjustable FM sound injection level control, so we can find the happy point between Intermodulation and not enough audio carrier to be heard.

A License Porposal

The State of our Hobby. an editorial and Rules Change Proposal
by Henry KB9FO

Is there a ham store left in your state?

Since October 1996 I have received notice from seven ham stores that have closed their doors. If this were to continue, we would be down to AES and HRO by the end of the year. Seventy year stalwart Henry Radio in Los Angeles, home to Tempo rigs, amps and the famous Henry line of HF amps (4K-2 and 6N2 and a 3004 currently reside in my shack) closed their doors this month. I spoke with Ted Henry Sr., who remarked that it was not an easy decision, but there just weren't enough hams buying gear anymore. Now that is in Los Angeles, the most ham populated part of the country, with Jun's and several HRO stores still operating. All total, over twenty ham stores closed their doors in 1996 and the first few months of 1997. Everyone is citing a slow down in ham buying. All say the "newbe's" buy an HT or a mobile rig and that ends their ham radio buying. Few are getting into higher grade licenses, and even less are buying big HF rigs. There are almost no new Novice licenses being issued. Not surprising. Most higher grade licenses are upgrades from pre no-code hams. How does this affect us? With less ham stores, there are less places to sell retail copies of ham magazines, and less places for people to discover ham radio. Less stores also means manufacturers need to advertise less, because sales are down, and there is less money to pass around, so our ad sales suffer too. Less advertising and less retail sales means smaller income for ham magazines which means smaller issues of ham magazines or much higher subscription prices. NOT GOOD MAGEE! Ham radio is in a continuing downward spiral with no end in site.

This is not a new phenomenon. For those of us who have been around a while, I remember Doc's Radio Supply, W9HJS (Hairy, Juicy Sandwiches) on Milwaukee avenue in Chicago, a few blocks from Howard Electronics and a genuine junk shop that occupied a house on Milwaukee in Niles a mile or so away. There you could buy hardware or parts by the pound. I bought my first SWL receiver at Docs', an SX99, later a 101A. As a kid I would take the bus to Allied Electronics on Western Ave., home of Knight Kit (Remember the R-55 and T-90?) On the east coast there was Lafayette Radio, on Jericho Turnpike on Long Island. And most of us remember Heath Kit and the Benton Harbor lunch boxes! A chain of Olson stores sold parts in little bags, "a kit of 3 SW101 switches 99 cents!" I worked in two of the stores while in high school, taking home a cool $100 a week (back when the minimum wage was $1.10) and a hefty 20% discount, which helped stock my test equipment and parts boxes and I had the time to build all sorts of neat stuff from the pages of Electronics Illustrated, Popular Electronics and others. I remember building a 2 meter regen receiver (two tubes) and a four tube (6AQ5 final) 160 meter AM TX. Five amazing watts RF output into a random long wire! I used a car radio with a retuned LO for RX.

I sat and thought about how in my ham life I have purchased over 300 radios over the years, most were from companies that no longer exist. National, Drake, Swan, SBE, Heath, Trio (now Kenwood), Hallicrafters, B&W, Multi-Eimac, Regency, Genave, Gonset, Hammerlund, Clegg, Polycom, Allied/Knight, Lafayette. The common thread among all of these was they were FUN radios. You could put in various mods to make them "better" or extend their range (Clegg FM27 was originally a 1 MHz coverage 2 meter rig, another Michigan ham and I modified them for two later 4 MHz of range! Imagine, going from an HR-2 6 channel rig (or a slew of modified Motorola/GE/RCA/Link stuff) to a rig that covered the whole band! My, and other's early repeaters were usually modified stuff, Motorola G strips and Sensicon A's, T43GGV's and T-44's. Back then if you were in radio, you were IN your radio . . . a lot!

Today my shack has few home brew items, and Kenwood, Icom and Yaesu populate the operating area. My spare time to fix or modify or build anything has evaporated into three hours of daily commute, 10-14 hour work days, and a couple hours at the computer trying to keep up with orders, subs, and getting an issue together, and checking the E-mail. With luck, an hour with the family to cook dinner and eat before its time for the 10 p.m. news and hit the sack. Although many do, I have no interest to get On the air and talk about computers. My computer effort currently is to covert to Mac from Windows. So I have a Mac sitting here, loaded with programs, 4 SCSI drives, and high end video card (Targa) and a bunch of other stuff, to try and learn computer video/graphics/web stuff, and maybe get more of the magazine done on the Mac to add graphics and stuff that my 486 doesn't do, like import video for on-air and taped material that I want to insert in the mag without taking a picture of the TV screen.

A License Porposal

Who says computers are cheaper than ham radio? The guys on the internet say digital TV is cheaper than ham tv...I don't think so. $2500 for a new Apple computer, four Gbytes of SCSI HD's, and a $2000 Targa video card; $600 color printer, $500 monitor, a 8X CD ROM; I skipped the page scanner for now, Adobe stock probably went up three points when I got out of the store-- $9,000 in software: nearly every Adobe product plus things like Elastic Reality, Debabelizer, Logomotion, and video/audio editing software, Norton's, and a bunch of "free included with" stuff that I have no idea what it does or how to use it! Free CD ROM of 10,000 fonts! I have a hard time handling 200 fonts, and stick to 2-3 for this rag. You folks didn't like it when I tried to get fancy with fonts! 100,000 Clip art images, about five of which are useful for ham radio! Its been two months and I have yet to get my first CUseeme internet QSO. No wonder there is little time/incentive to play with ham radio. We're all tinkering on the internet, web pages and URL's. So I got to thinking. Whirrrrr, buzzz, clink clink. Last October (1996) I filed a 14-page Petition for Rule Making with the FCC. No RM yet. You may have read about it in W5YI report, and it is supposed to be printed in total, with twelve charts to explain it, in an upcoming issue of 73. What is it?

It's a proposal to change the nature of how we do ham radio licensing. Ham radio has changed severely, except for a small suburb near Hartford, CT which is still spending countless valuable resources to organize a new CB band at 144 and 444 MHz for more empty FM voice repeaters. The old incentive for tinkering, building, operating has mostly disappeared along with the ham stores, parts houses, Heath kits, and manufacturers. Incentive licensing didn't do us any good either. The time competitor for technical people is now the computer/internet. Why struggle to make one contact in Hamburg, when you can check into a chat room filled with people from Hamburg, for the cost of a local call, vs. a couple grand of radios/antennas, TVI complaints! But we still do things like WAS, DXCC, county hunters, fox hunters, and contests. There are still those who pound brass because they WANT to. There are still lots of NET's and there are the 2% of hams who still experiment, build, tinker, and play with more than FM and SSB.

So let us change from a helter-skelter system of license classes which have little meaning for today's ham, to a more simple one that offers more and can offer accomplishment. No more boring tests, no more grinding out hundreds of hours of CW tapes. Lets change from a test oriented license system to an Achievement oriented license system. Those familiar with Scouts (boy, girl, or otherwise) or professional accreditation, or Pilot license requirements will recognize this idea right away. If you get N merit badges, you become an Eagle Scout, N hours and you are a private pilot, another series with an instructor and more hours and you get Commercial/instrument, more experience and you qualify for ATP. Well why not a Ham Radio version of "merit badges" . . . WAS, WAZ, DXCC, etc? And what's with these names, Technician, Novice, Extra. Extra what? Extra fat? Extra Cost?

My proposal is based on three steps. Explorer, Adventurer, Expert. Who wouldn't want to claim to be a Ham Radio Expert, and has the FCC paper to prove it? Got your Ego working?

The entry license, Explorer Class, would be just that. Explore ham radio. Not a few narrow CW bands, not just VHF/UHF FM, but the whole range. HF, VHF, UHF, Microwave privileges, CW, SB, FM, Video, Spread Spectrum, whatever turns your crank. Explore ham radio and find out what you LIKE to do. Contests, DX, brass pounding, whatever. Not all the bands and privileges, but a good sampling, even on bands that work when the sun spots don't! A reasonable test on the rules, safety, and operating to get you going. Now you can do more than buy a 2 meter HT and act like a licensed CB'er. Get on HF and work a little DX, do some Oscar, fiddle with TV, SSTV, 160 meters. Get to experience a broad range of activities and areas to develop (self learning) knowledge and experience. More than knowing the Q code for FM repeaters.

Now along the way, earn your WAS, or a CW proficiency certificate, go to hamfests and read some magazines. This is called continuing education. Take in a seminar from the local ham club on new rules, or antenna/RF safety. Gain more knowledge. Have fun while you're at it. When you get 100 points in "merit badges" turn in your chips and get the Adventurer Class license. With the next license, you get full privileges and full power, only a few areas out of your rhelm. But now you can get DXCC, WAZ, 5 band WAS, work some major contests, write for magazines, maybe teach some new hams stuff, integrate your computer to your ham stuff, build a repeater, and enjoy the adventure of ham radio. Along the way, collect some QSL cards. After a while, you will have accumulated more "merit badges" to get to 400 points, and turn in your chips for the Ham Radio Expert Class license.

Now you are Mr Know-it-all and have the wall paper to prove it.

A License Porposal

Now your ham license actually STANDS for ACCOMPLISHMENT. You actually DID something besides study an ARRL Q&A license guide to up grade. Your incentive to operate is based on your desire to DO things and to upgrade to greater range of activities and interests becomes an out growth of your personal growth. No more one trick ponies. You won't be able to brag that you got your Extra and never plugged in a soldering iron.

Now this is not for everyone. So lets grandfather those who want to stay where they are. They can renew their current licenses until they die. We won't reduce their privileges as the ARRL Incentive Licensing system did. But you can't upgrade to another "old" license class, if you want to upgrade, it will be to a new license. Just meet the new criteria. In other words, get out there and DO something. Get a feeling of accomplishment. Turn that county hunter certificate or SMIRK certificate or Sweepstakes score into something worthwhile, a higher grade license/call sign.

Now the emphasis will be on OPERATING/LEARNING/ACCOMPLISHMENT on the air. QSL cards will fill the mail boxes. Ham magazines will flourish with new readers and writers, who will want more and have a reason to buy/build more equipment, and the VE's will be busy checking certificates rather than test scores.

The point will be that there is a huge pool of activities that will accrue "points" toward your upgrade. If you want to pound brass, your 35 WPM ARRL certificate will count, if you don't choose another area . . . high contest scores, author an article, get your DXCC, WAS, etc, work 3 CM, or 160 meters and get the QSL's to prove it. YOU CHOOSE WHICH CRITERIA you collect to get enough points to upgrade. There would be NO mandatory areas except safety and regulations which could be satisfied by attending a one day seminar at a ham club, hamfest or community college. Your mailing labels for five years of ham magazines could be proof of continuing education. Get the idea? We have to change the nature of ham radio to compete with other time interests. We can do that by encourage OPERATING not book/brass study. Besides, operating IS the FUN part of ham radio anyway! So lets encourage it!

Invariable there is the question, who determines how many points or merit badges. Answer, the VEC's joint committee. Each ham radio organization that wants its operating certificates considered, submits the criteria for earning the certificate to the VECJC who determines how many points it is worth. Determines how you ask?

The whole point is each "evidence" of operating has some value. The point value should be assigned by difficulty and breadth of experience each represents. Thus a WAS has x value, a DXCC has y value. There is always someone who will raise the question, "I got my WAS by using a voltaic pile and a frog's leg to work the key so it should be worth more." Well you had better have the frogs leg and there had better be callouses on its flipper that match the knob of the key!. Sorry, just because you could create a unique circumstance in which to achieve the WAS (or whatever) doesn't give it any additional value. However, if the WAS was for 50 states on only 2 meters and only from Oscar, vs a bunch of HF contacts on 4 bands with some 6 and 2 meter stuff thrown in, there is a difference. The first gets the plain vanilla 5 points, the second gets 7-8. Why? Because the first represents only one operating mode and patience. The second represents (likely) several modes, several propagation experiences and therefore has more breath to it. It gets the extra points because of the additional modes and propagation methods: 5 points for WAS, and 2-3 of the 5 points for operating 7 or more bands or for working 7 or more modes. Keep in mind this is just an illustration, not necessarily the final say so on how many points for any particular operation, yet.

Now we need to do one more thing. We already started. There are a lot of HAM WEB PAGES, on the internet. These are great starting places for those who stumble over them. Lets do it one better. Lets tie the HAM WEB PAGES to each other (as some have) and lets ADVERTISE ON THE WEB and elsewhere, the FUN stuff on ham radio . . . not, "The Tennessee Valley Indians Home page is located at HTTP:\\ www.TVI.com," but put key words in the title so search engines FIND us. How about RARE CONTACT WITH ALIENS (DX), INTERACTIVE TELEVISION (SSTV and ATV) ANTIQUE RADIOS (tube rigs) etc. RADICAL RABBIT EARS (antennas). CURE SPECTRUM SPREADING . . . Get your imagination going and lets SELL ham radio to those who are looking for the next challenge. And yes, you can tie the internet into your local repeater so that you can HT from LA to London to Sydney. Do it with video too! 73 Henry KB9FO

Canadian ATV
Ottawa's New Video Repeater
Bill Westbrook, VE3EKA

After four years of planning, the first video repeater is now operational in the Canadian Capital. Located at CJOH-TV, a local TV station, and built by the Seniors Video Repeater Committee of the telephone Pioneer Amateur Radio Club for the use of all amateurs within the 30 mile radius of the predicted coverage area.

Funding was obtained from two government grants. In addition to universal medicare, in Canada we have social programs, including a New Horizons Program that will give a seniors group financial support for a project that gives them a reason for getting up in the morning. Not bad eh?

Planning

Bare Bones or State-of-the-Art? When you decide to build a video repeater, there are some questions that have to be addressed. First of all, will it be bare bones or state-of-the-art? Granted, this decision will be influenced by the depth of your pockets, and the technical expertise available. We were in the fortunate position of having adequate funding and committee members who worked for world renown R&D organizations where state-of-the-art is a way of life.

Reused or New Equipment? Unlike VHF/UHF voice repeaters, a video repeater can't be built from reused taxi or telephone company radio equipment. Nor can you buy a ready built video repeater. A well designed video repeater will usually consist of equipment units, carefully selected from several manufacturers, that will meet the design requirements of the system.

AM or FM?

When we discovered that, unlike here in North America, the video repeaters in Europe were invariably frequency modulated, we did some research that turned up the following advantages of using FM: Better Linearity, No Sync Signal Compression, Signal to Noise Improvement, Improved Co-Channel Interference Immunity, Immunity from Fading,

On the downside, these advantages come at a price. FM equipment is more expensive. I was sold on FM when I compared the signal quality using VSB AM and FM over a 13 mile link.

Site Selection

Of the four sites considered, we selected a downtown Ottawa location. When the Chief Engineer at TV station CJOH offerred the use of their location we accepted, with alacrity. With our antennas installed 130 feet above the street and one of our committee members working there, it seemed the best choice.

Frequency Plan

Here in the frozen north, we have only one ATV frequency available at 439.25 Mhz. It was chosen for an AM input with a FM output at 914 MHz. Later we plan to add a FM input in the 1.2 Ghz band.

Repeater Council

The frequencies chosen have been co-ordinated, with the approval of the active repeater council in our area.

Industry Canada

The Canadian equivalent of the FCC agreed that 914 MHz would be a suitable frequency for our repeater output.

Financial Management

With government grants totalling $20,000 it was essential to keep track of, and be ready to justify all expenditures.

Funding

In addition to the New Horizons grants, we found the regional emergency measures unit to be very supportive in terms of donated equipment. Both BNR and Ericsson have made generous donations of equipment for our repeater project. Sometimes it is better to be lucky than smart!

Insurance

Our Telephone Pioneer Association affiliation allows us to qualify for public liabity insurance to the tune of $10 millon dollars.

Contacts

During the planning stages we contacted ATV groups in a number of locations, including Calgary, London, Burlington, Dayton and Bellevue. Rather than re-inventing the wheel, we thought it wise to seek out ATV groups with repeaters, and hopefully learn from their experience. We are grateful to those contacted for their unselfish encouragement and the technical information supplied.

VE3TVA Video Repeater

Inputs: 439.25 MHz AM, 1.2 GHz FM (later)
Output: 914 MHz FM
Marker Beacon: 439.25 MHz

When the repeater is not in use a video test pattern is transmitted, along with a scrolling explanation of how to use the repeater. For 2 seconds of each minute the controller is looking for incoming video. If detected, the controller switches over to allow the repeater to see the incoming video on 439.25 MHz and repeat it on 914 MHz.

Antennas: Lindsay 4SZZsq, 9.5 dBD gain, horizontal polarization
Power Output: 1.5 KW ERP
Expected Coverage: 30 miles
ATV Repeater Controller: Micro Computer Concepts VS-100

- Ten Video and Four Audio Inputs
- Input for Touch Tone Remote Control
- Video ID Input
- Built-in Sync Detector

Filter Design

Members of the committee combined their skills to build the high quality filters. The band pass filters were designed by Jim Jarvis, VE3TI and constructed by Nick Krauchuke, VE3FFW. When completed the brass filters were silver plated to improve their operating efficiency. Barc Dowden, VE3TT designed the splitters and combiners used in the transmitter power output stage that utilizes four cellular radio linear amplifiers.

Current Status

On-the-Air
Work Remaining to be Done:

- Increase Power Output to 200 watts into Antenna
- Install Packet Radio Remote Control and Monitoring System
- Install 1.2 Ghz FM Input

Getting Started on ATV

There are a number of inexpensive ways to receive the marker beacon on 439.25 MHz. You may be able to receive it with equipment you already have. If you are close to the repeater, you may not need a directional antenna with low loss feedline, but generally these are highly desirable if you want to receive a snow-free picture.

Tune a cable ready TV to cable channel 60 (not broadcast channel 60). Disconnect the cable co-ax from the

set, and connect a good quality 440 MHz antenna. If you live next door to the repeater you can use rabbit ears. Point the antenna toward the repeater and remember that the signal is horizontally polarized.

Another cheap way to get on ATV is to get that old UHF TV set out of mothballs and tune down below broadcast TV channel 14 (471.25 MHz). Some of the old sets have a knurled wheel for tuning UHF channels that will allow you to pick up 439.25 MHz.

To receive the repeater output on 914 MHz FM-TV a standard LNB satellite receiver can be used to convert the FM signal to AM that your TV set can handle. We bought a number of these receivers at Dayton this year for $10. Make sure it receives in the 900-1200 MHz range. Use of this equipment will give you a sample of ATV and perhaps whet your appetite for better things. In order to achieve cable TV quality you need to use narrow band FM-ATV equipment. Top priority should be given to the best results that result from the use of a good quality antenna, with a mast mounted pre-amp with DC fed up through the co-ax, and low loss co-ax like 9913, or even better heliax.

How ATV Can Benefit the Community

Amateur TV provides a number of opportunities to pick up some brownie points by doing a good turn for your community. For example:

Public Service Activities

Fund raising events like our annual MS Bikeathon are a natural for providing the event organizers with live video coverage from checkpoints along the route to enhance the voice communications.

Emergencies

Members of the ham community have always been quick to offer assistance in the event of an emergency. When our local Emergency Measures Organization heard about our video repeater's capability they recognized at once how useful it would be during an emergency. We hope to set up a simulated disaster that will give us an opportunity to prepare for the real thing if it happens.

Visit the North Pole

A visit to a Children's Hospital at Christmas could be set up to allow the kids to talk to and see old Santa at the 'North Pole'.

Nursing Homes

In our neck of the woods, there are 14 nursing homes. In them are a number of married couples who are separated from one another, for various reasons. Providing we can access the repeater from both locations they can be re-united via a video link.

Telecast of Ham Meetings

The ham club members, with ATV equipment, could monitor the monthly meetings broadcast via the Video Repeater. They would have to provide their own donuts and coffee.

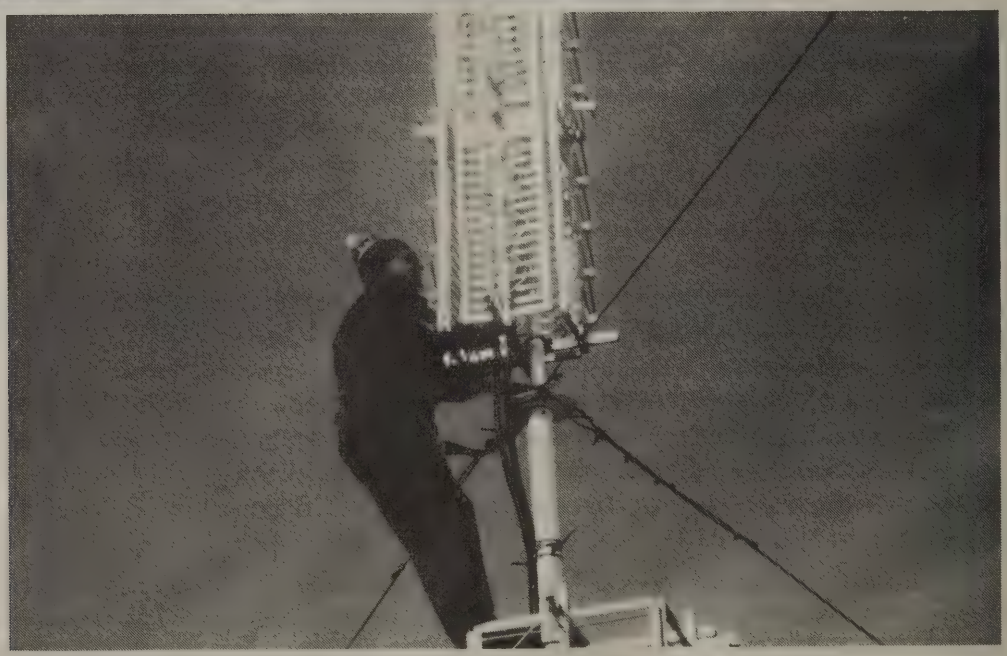
These are but a few of the uses that can be realized with a ATV Repeater.

Internet

Having access to the internet has proven to be a valuable aid to planning and implementing our video repeater. With the majority of our committee members on the web we can get minutes of meetings and any changes in plan to them easily. Our contact in Sweden, who donated the linears has an e-mail address that facilitated arrangements for shipping. ATV Groups like those in Houston, Atlanta, Dayton and California provide inspiration by the provision of excellent information via web sites and the mail list organized by Doug Ferrell in Florida offers access to a wealth of readily available ATV expertise.

73 Bill Westbrook, VE3EKA, 848 Acadian Gardens, Orleans, ON K1C 2V6, Canada, Billwest@igs.net

Canadian ATV



Amateur Television on 10 Ghz
by Gérard Bouvier and YL, F1ELY

Note: This article first appeared in the French magazine "B5+" for October 1995 on page 4. "B5+" is the official journal of L'Association Nationale de Television Amateur (ANTA) of France. It was translated by John Jaminet, W3HMS, of Mechanicsburg, PA, himself an ATVer and member of ANTA, who recently attended their November 1996 meeting.

Historical Background.

In these lines, I will expound on some of the different equipments which are possible for ATV reception on 10 GHZ. Some years ago, nearly 20 now, the system of reception was very simple, less costly, and far from performing very well. The principle called auto-mixing was used equally in wide-band FM. The advantage was to get on the air (QRV) quickly in transmission and reception and for nearly nothing in cost. Then came the large public satellites with a number of advantages for us, the radio-amateurs, to draw from.

The frequency (Ku band) was next to ours in 10 GHZ , the price was attractive, the equipment was small in volume, and the use was convenient. Certain OMs, such as Serge Riviere, F1JSR or Michel Vonlanthen, HB9AFO, among the best known, did some years ago use the 11 GHZ LNB heads with a local oscillator on 10 GHZ.

The biggest problem was that the demodulator couldn't use the satellite TV intermediate frequency band 950-1750 Mhz (Trans. Note: 950-1450 Mhz in the US) and give a corresponding output frequency for the received signal at 10,450 MHZ in this band, e.g. 10450 MHZ less 10000 MHZ=450 MHZ. It was possible for well-informed builders to fiddle with the LNBs, but that limited the number of hams so doing.

The Modern Solutions:

First Possibility:

Described by Denys Roussel, F6IWF in the summary of CJ-94, I recommend you read this for his quality technique.

(Translator's Note: English language readers can find his article in "VHF Communications", Volume #27 for Spring 1/1995 entitled "Modifying Satellite Receiving Systems for 10 GHZ FM ATV Operation".

Briefly, it is necessary to modify a LNB 12 GHZ head (TELECOM) for using ATV on 10 GHZ. The operation remains simple if one uses the filter with the TONNA head, unfortunately certain houses sell this at prohibitive prices.

Average list price: $70 US (350 FF) for the head and $40 US (200 FF) for the matching LNB horn for a total of $110 US (550 FF) for the majority which is rather expensive.

Average real market value: $30 US (150 FF) for the head and $14 US (70 FF) head and horn of the same characteristics, total $44 US.

Again there remains the filter problem on Teflon and the video inversion. This solution is super FB for those who find a head at a good price; I myself have modified several types of heads with this filter with very good results.

Second Possibility:

Take a LNB head called ASTRA 1D with a local oscillator on 9750 MHZ and build a tuner internal to the demodulator in order to pass from 950 MHZ, the minimum frequency of the band, to 650-700 MHZ which gives the local oscillator frequency plus F1 demodulator..... 9750 Mhz+700 Mhz=10,450 Mhz, the lowest ATV frequency in 10 GHZ. (Translator Note: per their normal frequency usage in France).

This solution is not viable, except for the very good constructors, because the satellite receiver can't work on 1255 MHZ in FM MHZ or for satellite reception.

Third Possibility:

For those who don't want to connect up their soldering iron and be on the air quickly, take your checkbook to the corner satellite kit dealer!

Materials Utilized:

-A European style receiver with the new band 700-2050 MHZ.
-A satellite LNB head with the local oscillator on 9,750 MHZ.
This will give the lowest frequency of 9750 + 700=10,450 MHZ
and the difficulty is to find a receiver which goes as low as 700 MHZ and which also works properly at the low end of the band.

Fourth Possibility:

All now becomes easy!

Material Used: An old European standard satellite receiver 950-1750 Mhz or a receiver for 1255 MHZ constructed around a narrow bandwidth of 14 or 16 Mhz.
A LNB head with the local oscillator on 9,750 MHZ.

A ASTRA 1D converter with a local oscillator at 500 MHZ (Translator Note: I believe this to be another LO as the ASTRA 1D noted above has the LO at 9750 MHZ). We have noted that 10,450 Mhz is transformed by the LNB head to 700 MHZ which is then passed to the converter which comes out at 1200 Mhz, e.g. 10450-9750=700 + 500=1200, simple no?

I have call your attention to note that I have tested a large number of converters from several sources. Certain among them have functioned very poorly for this use for weak-signal reception. Some others had internal switching between normal use and converter use.
That can sometimes cause problems if the information about switching is unclear. In all the cases enunciated, the principle remains for an ideal solution for:

1. Permit going below 10450 Mhz, say 10,400 Mhz without loss of signal
2. Using a satellite receiver or 1255 Mhz receiver without modification.
3. Making a notable reduction of the clutter in going portable.
4. For those with doubts about their competence with a soldering iron, it is not necessary to risk sending their station up in smoke.
5. For a minimal budget, all is usable for satellite reception, for 1255 Mhz reception, etc.

Building the simple mechanics.

The principal of a permanent installation is to permit having 10 GHZ ATV or satellite reception on 11 Ghz for ASTRA, EUTELSAT, etc. (Translators Note: Consider these satellites as our Ku birds)

Functioning:

- A rotator, not too rapid, permits adjusting the azimuth.
- A vernier dial permits adjusting from several degrees less than 0 to about 40 degrees of elevation for the most southern satellites .

It is not mandatory, but if you have an adjustable skew control, you can make a precise vertical or horizontal polarization adjustment on each satellite. For my part, I have mounted a standard H/V LNB head (14/18V). The true "end of the ends" is to mount the transmitter above the reception head which permits arranging the transmitter and the receiver on the same antenna. The vernier corrects the offset error due to the position of the transmitter on the reception head.

This configuration is in the process of being mechanically put in place. It will consist of a DRO type transmitter per the F6IWF design and the #4 method as above of reception using an 85 cm (34 inch) parabolic antenna by LENSON.

Note #1. There is a garbage can lid and parabolic antenna! Don't be confused if there are several lids and antennas at the discounters which have similar looks. Here's hoping that this has clarified things so that you will feel like getting on the air not only on 10 GHZ but also on 1255 MHZ.

Note #2. Provoking our discussions then building agreements as we have done it in our clubs for the use of 10 GHZ between TV and Packet. Therefore no transmissions other than TV between 10450-10500 MHZ and no packet or TV in the phone band between 10368-10370 MHZ. There is a place for us (TVers) in this band and it is up to us to manage it. Thanks and 73 QRO.

An American in ANTA (France ATV)

by John Jaminet, W3HMS,
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I had heard of ANTA, "L'Association Nationale de Television Amateur" of France from the Swiss ATV Association News. I am a member of this fine association and also of the BATC. I had only received in October ANTA's first three editions and I was much impressed with their high technical quality and their skilful use of color.

My adventure started innocently enough. I was sitting in my station/office writing ~heck on the first day of November when at 1200 the phone rang. It was Michel AMIARD, F6ANO, the President of ANTA and he called me from Paris to discuss my request for reciprocal translation and publication rights between ANTA's quarterly magazine, B5+, and ATVQ. Now Michel speaks good English and I always like to speak French when the occasion is at hand....and it was!!!! Forty minutes later we had discussed in two languages all major factors of ATV on each side of the Atlantic during which he had casually mentioned that their General Assembly was to be held at Tours about 100 miles south of Paris on Saturday 9 November. Thank God it was his bill! !

Now it is a fact that my wife and I had arrived at the Dover AFB DE on 17 October to catch a C5A Space-Available for Ramstein, Germany which was feasible as I am a retired Naval Reserve Captain. This trip to the Swiss ATV General Assembly on 19 October near Lausanne was still-born when I learned that the flight was cancelled and none were available in the time window essential for our arrival in Switzerland. It did occur to me that I already had my European railroad ticket good for 5 days in Switzerland, France and Germany so I needed only to get some cash. So I casually called Dover AFB and found that they had 3 C5A flights on Wednesday before the Saturday meeting.

So, I did what all wives wish their husbands would do, I called my wife, Velma, and said: "Honey, would you like to spend the weekend in France?" She gulped and said, later, she had too much work but I could go by myself.

So I checked the space available schedule on Tuesday 5 November at 1600 and made the decision GO GO GO!!! I left the house Wednesday 6 November at 1400 and we left Dover AFB at 2330 on a C5A, the world's largest plane, arriving at Ramstein AFB, Germany about 1330 Thursday 7 November. I took a train to Paris arriving about 2130 and I called Michel from my hotel in Paris. "I am here I said and he was very, very astonished! So, we went to a small French bar near my hotel in Neuilly-sur-Seine about 1 mile from Paris to wash away the "air and road dust". The bar had the typical and charming French ambiance as we see in the American movies.

On Friday 8 November, I went to the Orsay Museum and to the Louvre Museum. It was easy to just walk in during the winter...I was the waiting line!

On Friday night about 1945, Annie, Michel's wife, Michel, and I drove 100 miles together, much in slow Friday night Paris suburban traffic. We had lots of time to chat and we did! During our talks, I mentioned I was a member of Toastmasters International, the public speaking organization, and as such, I was used to speaking in pubic although, NEVER in French.

The Meeting was held at the Hotel ASTER, 238 Avenue Charles de Gaulle at SAINT-CYR-SUR-LOIRE near Tours. The morning session was gavelled to order at 0945 by President Michel, F6ANO. He introduced me as the only overseas member in attendance and others. He reviewed the actions taken and successes achieved in 1996 by the group which included several representations by ANTA to the French government FCC equivalent and to the REF, their ARRL equivalent. Then, he thanked the authors of the many fine articles in B5+ and had the group observe 1 minute of silence for the Silent Keys. ANTA has today 438 members after only starting in the Spring of 1995. I think ANTA has a very fine quarterly magazine, the B5+, it is B5+ in Europe, same as P5+ in the USA. Their sister organization is the Swiss ATV Association of which Michel Vonlanthen, HB9AFO is the President. Both presidents are members of the other organization as are other members of each association. I myself am a member of both. Michel also observed that amateur radio happenings with the FCC in the USA can affect French hams and others. They now have 14 ATV repeaters on the air in France. Their 1997 meeting will be held in Strasburg, France on 8 November. Michel stressed the need to use and to defend their ATV frequencies.

ANTA

Physically, the setting was a medium sized motel with conference room near Tours, France 100 miles southwest of Paris. There were about 40-50 people in attendance from throughout France from their 414 members. Like our ham organizations in the USA, it is a totally national language speaking organization. For me, it was a total immersion in the French language and culture....and it was great! ....but not a tourist thing to do anymore than are the US organizations a tourist thing for overseas members. I had made considerable progress in French vocabulary building and in my comfort level in speaking with people, but this was always a one on 1, 2, or 3 thing. I had other concerns: Would I "fold" or make a fool of myself? Would I "freeze" and fail to find the words I needed? Heck, we all do this here! ....and if I froze, I could always claim to be 81 yrs old and afflicted with periodic seizures. Could I use their mike with one hand, make gestures with another, and use no script? Would I try some funny lines..and get stares?

I spoke about 15-20 minutes and covered:

—The story of how I came to go to France (as above). —Our 70 cm television repeater in York PA — Typical local amateur television operation —Common equipment used by local hams. —The W3HMS television station —My new tower with the climbing collar, the Hazer —Questions and answers.

They asked, among other things, about the number of hams in the US and the number of ATV hams, the quality of representation of ATVers and hams in general by the ARRL to the FCC. I answered all questions honestly and as my opinion.

My impressions:

I was less nervous than expected in my speaking and I surprised myself! The humor seemed about right, .if something was funny they laughed, if it wasn't they didn't, .not like US commercial TV with dull plots and laugh machines. A double translation was necessary on measures. 50 feet makes little sense, 16 meters is real. I received a nice applause and they bought my $20 lunch. People chatted easily with me one-on-one after my talk. Some said candidly that they studied English in school but with few occasions to use it, they forgot it.. just like, in reverse, the good old USA!

In discussing public knowledge and opinion of hams in the USA and in France on the way from Tours to Paris, I was quite surprised to lean that French hams are not allowed to perform pubic service such as we do and for which we have our biggest claim to fame in the minds of the public.

I related my experience with a 150 mile bicycle rally in July where 25 or so hams provided communications at the security check zones all for the security and well being of the riders. I suggested that, in my view, the hams in each nation are missing a critical success factor for the longevity of hamdom if they are not allowed to perform public service.

I was quite impressed with the technical skills in their use of 13 and 23 cm, of FM for ATV, and of 10 GHZ activities using modified TV Satellite LNBs. I think they are technically ahead of us by a discernable margin.

ANTA has 438 members after only starting in 1995 which I think is great. I am very impressed with their magazine B5+.

I am also impressed with their sister organization, the Swiss ATV Association, Michel Vonlanthen, HB9AFO, President, which has been in business only since early 1995 and with a sizeable membership and excellent bulletin.

Listening to Michel, F6ANO, stress the point of frequency use and defense of amateur frequencies made the need for each nation to have an ATV organization axiomatic. That we do not have one in the USA is regrettable and can only work to our detriment. Heck, we don't even know how many of us there are in ATV.

Once ATVers in the major countries set up their national organization, there is a major need for an umbrella organization at the intercontinental level. In an umbrella organization, all national groups retain their autonomy just as members retain their own names, calls, etc. in their own organizations. I know this is possible as more than 20 US veterans organizations have put one in place in Washington, DC. and ATV hams should be able to be as creative as veterans. The umbrella organization could issue a periodic newsletter in 3-4 major languages. Internet EMAILs could be the linking medium.

ANTA

The problems on each side of the Atlantic are about the same, e.g. hams are busy people with their jobs, families, civic/political activities, their other hobbies and of course ham radio and funding all the above. People are very busy!

ATVers are a very small percentage of the total number of hams in both the US and in France. As a result, ATVers may not receive what they consider to be proportional support by their national ham radio organization.

I didn't get to see the VHS NTSC 2 hour format cassette I made for the meeting but Michel, F6ANO told me later by EMAIL that they viewed it OK.

Their are many people to whom I would like to say: Thank You So Very Much:

Michel Amiard, F6ANO, the President of ANTA who encouraged my attendance and supported me so much while I was there (including meals for which revenge in the US is prescribed, HI!) as did his charming wife, Annie. He has travelled much in the US personally and on business...and he like the place!

Madame Gouhier of Rouillon who collects scenic post cards from overseas and approached me after my speech saying she would like one from the USA. She put her address in my note book...and her card was in the air in November.

Jean-Francois, F1EDM. He reminded me of the well-known and respected French actor, Gerard Depardeau. He let me stow my gear in his room after I check out of mine.

Denys Roussel, F6IWF, the Tonna "super engineer" and inventor of two microwave devices. He should get the Nobel Prize for Microwave Engineering. His wife is Silvia and they live in the countryside near Rheims. He reserved a superb motel in Rheims.

He drove me from Paris to his QTH and Silvia prepared a FB omelette and served french fries with a FB homebrew sauce. Denys showed me his very fine station with great home brew gear, 3 towers, and his FB and unique microwave gear.

Roland Cornuel, F8MM, the Treasurer who was most courteous to me and made me feel at home. He kindly pressed an inscribed QSL card into my hand as I had to leave early. .

Arnaud Cabaret, F6GNJ, who also kindly pressed an inscribed QSL card into my hand as I had to leave early.

Patrice Boyer, F1NSU, who gave me a ride from Tours to Paris, showed me his station and his 10 GHZ in and 23 cm output repeater and his ATV gear.

Jacques Kauffmann, F5HWA, who gave me a 10 GHZ info flyer and set a schedule with me for weekly QSOs on 17 or 20 meters SSB.

Jean-Michel, F1AGO who gave me a nice ATV color QSL card suitable for using as a test pattern...when I have added my call.

The Monsieur, F9CH who took off his nice little TV9CEE Mont-Blanc 1992 assault call letter badge as a souvenir of my trip. Like me, he was licensed in the Stone Age!!!

Marc Chamley, F3YX, the distinguished tech whiz who is the father of ATV in France and of whom I had heard many moons before 9 November.

The members of ANTA who unfortunately I had not enough time to speak with but who nevertheless expressed themselves so positively to me.

Although not a part of the ANTA meeting, I took the train from Rheims to Dijon then the TGV (high speed train) to Lausanne, Switzerland for a visit of less than 24 hours with Michel, HB9AFO.

I filmed his station with my 8 mm cam-corder in QSO on 23 cm and I participated in the QSO which he filmed. He kindly described his principal equipments in English for the guys in central PA.

My visit was too short but so enjoyable as were the culinary skills and delightful comments of his charming wife, Simone.

The trip home was via train to Ramstein, bus to Frankfort, charter L-1011 to Dulles near DC and car to the QTH...all without sleep for about 40 hrs!

It was a superb trip in all major aspects. We ATV hams are very fortunate to find active, intelligent, gracious, and well-informed ATV colleagues in other lands. 73 de John, W3HMS

"A proposed Amateur Television Organization for the USA"

by John Jaminet, W3HMS,
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In my article " An American in ANTA" about my visit to the French national ATV society meeting which appears in this issue of ATVQ , I said some things like:
"Listening to Michel, F6ANO, the President of ANTA, stress the point of frequency use and defense of amateur frequencies made the need for each nation to have an ATV organization self-evident. That we do not have one in the USA is regrettable and can only work to our detriment. Heck, we don't even know how many of us there are in ATV. [about 6,000 ED] ATVers are a very small percentage of the total number of hams in both the US and in France. As a result, ATVers may not receive what they consider to be proportional support by their national ham radio organization.

So, here is my Proposal for An American National ATV Society

I. We need a national ATV society because:

a. Other specialized groups do it....QRP ARCI, satellite users, etc.

b. Planning for adoption of new technology in a unified way...we don't need any new provincial fights about polarization or the 2 meter net audio frequency, etc.

c. We need to have some idea of the future when we make equipment investments.

d. ARRL may not always be the most effective lobby for ATVers.

e. There is always strength in unity to fight frequency takeovers or, even worse, FCC frequency sales which are FOREVER, I think.

f. INTERNET EMAIL will make communications among officers and members possible.

g. ATVers are now dependant on some magazine editor/company to host the ATVers meeting at the Dayton Hamfest. We should have a national organization to do it.

h. ATVers could easily have quarterly regional meetings rotating among principal cities in the region permitting members to participate in technical and business sessions

i. Sharing tech info less formally than magazine articles...it is very time consuming to write to formal QST authors' standards.

j. Developing intercity linking standards.

k. The old USATVS was an insulting joke...we need a real society.

2. Lead Group. I believe that the Central Atlantic Amateur Television Network (CAATN) or another large US club/group should take the lead to set up a national organization because:

a. Everyone has had the last 50 or so years to do so and no one has done anything of substance!

b. There is already one or more organizations in place to build upon.

c. We can "sell" the idea and implement the organization via the ATV Internet list and ATVQ.

d. The Dayton Hamfest or the York Pennsylvania Hamfest Technical sessions can be the drawing card to bring in people to have the formation meeting.

e. For the CAATN, it is situated on the populated East Coast which is advantageous for the national meeting or for regional meetings.

f The national group should have its headquarters close to or in Washington DC for purposes of liaison with the FCC etc.

"A proposed Amateur Television Organization for the USA"

3. The CAATN will hold its regular August meeting at the York Hamfest on 16 August 1997. If this article appears in ATVQ and in ATV list EMAILs, it could be discussed at the Dayton Hamfest with a view to holding the formation meeting or perhaps a regional meeting at York used to finalize the organization national structure. The group could start to formulate the following:
a. Band plans for ATV sub-bands working with either regional or National Frequency coordinators.
b. Liaison (perhaps lobbying) the FCC as needs arise by promoting communications by ATV groups.
c. Pull together various groups now in existence and combine forces to work for a common cause.
d. Plan for a series of meetings perhaps four a year, one in York (east coast), one in Dayton, (mid west), one in the Rocky Mountain area, (Houston, Denver), and one in Los Angeles or some where on the West Coast. This would give most ATVers's a chance of providing their input at least once a year without extensive travel.

4. Proposed Organizational Structure.
The most democratic plan is to have the national organization COMPOSED ofthe member ATV Clubs much like is done in some countries overseas, ZL and ON I believe. By this method, all major issues would be decided by totahng the votes of the member Clubs such that each person has one vote and the larger Clubs have a larger vote based on the number oftheir paid members. Another idea is to copy the national QRP society, ARCI.

5. A plea: think broadly about national issues, making American progress and little of egos (all officers salaries to be 6 figures $000,000)...and do not focus on petty details!. Let's DO SOMETHING!

6. Where do we go from here:
a. I will put this proposal on the ATV lists known to me.
b. We recommend discussion on the Internet Lists, Letters to the Editor of ATVQ, and EMAILs to myself with copies as you desire.
c. We recommend attendance at the CAATN meeting at the Pennsylvania Room, York Hamfest and Computer Show at the York Fair Grounds Complex at York, Pa on Saturday 16 August 1997. The luncheon, seminars and meeting will cost $10.00 or less.
d. We will plan to pubhsh the specific agenda and details in the May or June ATVQ.

73, John Jaminet, W3HMS, EMAIL: W3HMS@aol.com

A FREQUENCY AGILE TV MODULATOR

interpreted from prototype

the new TDA5G64 n1odulalor IC takes over fromt he previous standard TDA5660 P device. At the same time offerin~ a number of advantages for cost effective design of video modulators. The chip incorporates all the functions for mixing and modulating video and audio at RF frequencies between 30 MHz and 860 Mhz. This makes it an ideal candidate for HAM TV, and other applications.

The advantages of the new TDA5664 video modulator compared to its predecessor are as follows: 5V power supply voltage, no circuit adjustment necessary, reduction in external circuitry, DIP 14 package, SMD package available, FM Sound modulation, sync level clamping, peak white clipping, continuous setting of modulation depth for positive or negative video, high residual carrier suppression, low spurious radiation.

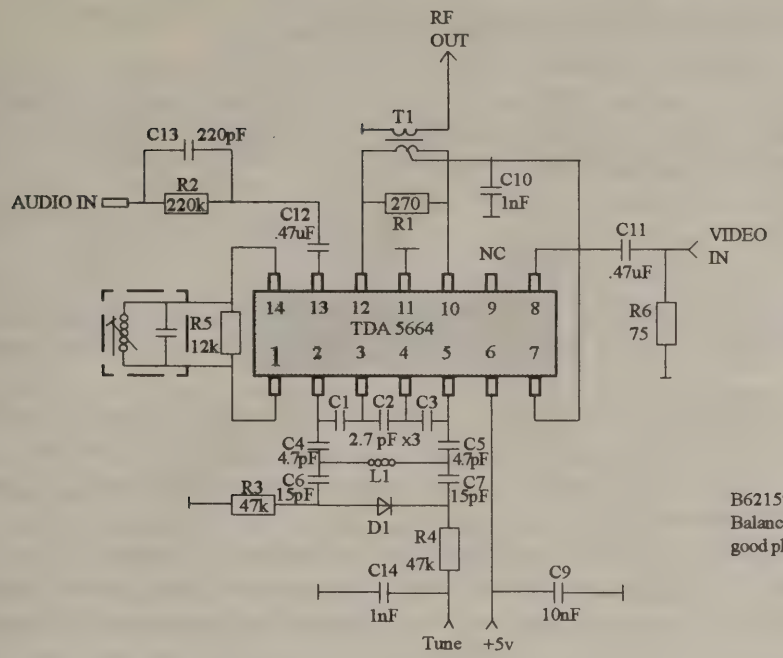
The video signal with negative sync level is applied capacitively to pin 8. The internal clamping circuit refers the inpu signal to the sync level. If the video voltage of 1V is exceeded, peak white clipping is caused. If pin 9 is open circuit the output signal is negatively modulated. When pin 9 is grounded, there is a switch to positive picture modulation By using a resistor value attached to pin 9 it is possible to adjust the depth of modulation.

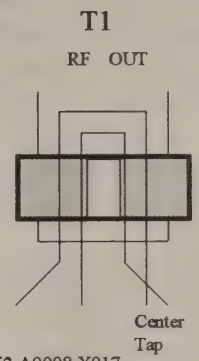
The sound signal is applied capacitively via pln 13 to the AF input of the sound input amplifier. Pre-emphasis is set by external circuitry. At the output of the sound section, the FM sound signal is added to the video signal and i mixed in the RF mixer with the oscillator signal. A parallel resonant circuit is connected to the sound carrier oscillato on pins 1, 14. The quality of the resonant circuit determines the vision/sound carrier spacing which can be altered by R5.

Pins 2-6 are connected to the amplifier of the RF oscillator. The capacitive reactance across pins 2, 3 and 5, 6 should be Xc 70 ohms and across pins 3,5, Xc = 26 ohms for the resonant frequency. The ground of the oscillator, pin 4 should always be taken to the shield (ground) of the tank circuit. An external oscillator signal can be fed in botl Inductively ad capacitively via pins 2 and 6. The layout of the PC board must have shielding of at least 80 dE attenuation across pins 2-6 and the modulator outputs 10-12.

For tne best residual carrier suppression the balanced mixer output (pins 10-12) must be terminated with a balanced broadband transformer of very good phase accuracy. The transmission loss should be less than 3 dB. This i accomplished easily with a ferrite balun transformer. Be sure to follow the winding diagram closely (Fig 3). The RF voltage output will be about 1.5 times the voltage across Rl. This will yield several milliwatts of RF, sufficient to drive an MMIC or discrete device in an amplifier chain. The frequency agility allows easy selection of any TV "channel" without any tuning of RF stages. If followed by MMIC broadband amplifier stages, several watts of video RF can be achieved with no tuned stages, although you may want to include a bandpass filter on the output is singl frequency operation is desired (or a narrow span of frequencies).

A FREQUENCY AGILE TV MODULATOR





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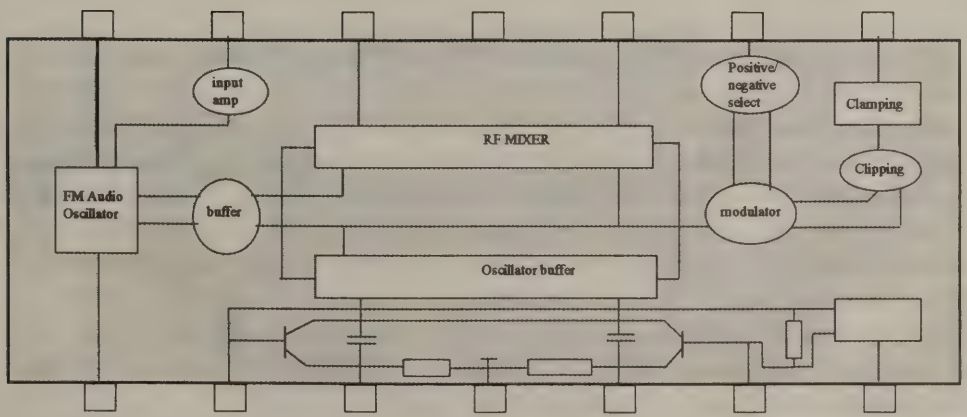

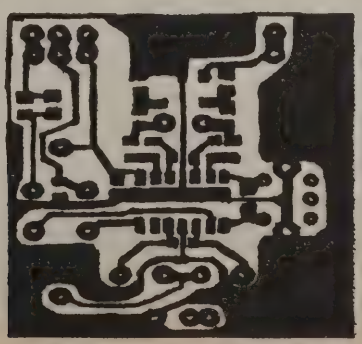

Please find below the details of the scientific discovery of the decade.....

New Element Discovered

The heaviest element known to science was recently discovered by physicists.

The element, tentatively named Administratium, has no protons or electrons and thus has an atomic number of 0. However, it does have 1 neutron, 125 assistant neutrons, 75 vice neutrons and 111 assistant vice-neutrons, for an atomic number of 312. The 312 particles are held together by a force that involves the continuous exchange of meson-like particles called morons.

Since it has no electrons, Administratium is inert. However, it can be detected chemically, as it impedes every action with which it comes in contact. According to the discoverer, one reaction that normally requires less than one second was extended to four days by the presence of a minute amount of Administratium.

Administratium has a halflife of approximately three years, at which time it does not actually decay but instead undergoes a reorganization in which assistant neutrons, vice-neutrons and assistant vice-neutrons exchange places.

Some studies suggest that its atomic mass actually increases in each reorganization. Research at other laboratories indicates that Administratium occurs naturally in the atmosphere. It tends to concentrate at certain points, such as government agencies, large corporations, and universities, and can usually be found in the newest, best appointed, and best maintained buildings.

Scientists point out that Administratium is known to be toxic at any level of concentration and can easily destroy any productive reaction where it is allowed to accumulate. Attempts are being made to determine how Administratium can be controlled to prevent irreversible damage, but results to date are not promising.
Lirpa Loof

ATV ALTITUDE RECORD
can anyone top this?

It looks like Mike Henkowski, KC6CCC, owns the ATV altitude record after a rocket launch last Saturday, Nov. 23 at Black Rock, Nevada. His 2417 MHz ATV signal gave a view of the earth all the way up to 53 miles, almost 280,000 feet before dropping back to hit the dry lake bed floor. The video package survived the impact and helped him home in on the signal seven miles from the launch site. The transmitter consisted of a FM ATV exciter, originally designed by Mike at his company, Microtek, for Part 15 license free use, driving a homebrew 1 watt amplifier.

There are Amateur rocketeers all over the US that are trying to officially get all the way into space... They build solid and liquid fueled rockets. They have to file a flight plan with the FAA etc. before they are allowed to launch and have to use such places as the middle of the desert etc. to make sure their "toys" don't land on someone's head or house... They had a special on the discovery channel a while back on this... Alex Van Halen (drummer for the band Van Halen) is one of the California rocket club members. Takes some serious bucks to play in their field though. David Cooley ...N5XMT...

I can tell you the ride a was wild 5 sec. burn, 35 G's, Mach 4.46, 53 miles high (based on optical and calculated measurements) & 200 mph fall to the lake below, DF'ed to it in 8 min looking at dirt clods. We have a future more aggressive launch in about 6 mo. 150 mile target alt. Check out Microtek web page for a sample of the 2.4 Gig equipment we used. (power out was 1 watt into 6dBic patch antenna). http:// www.microtekelectronics.com. We may post pictures on the page in the near future, check back. Mike Henkowski...KC6CCC

2.4 GHZ ACTIVITY

So you think the band is empty at 2400 MHz? Have we got a surprise for you. ATV'ers are probably the biggest users of the 13 cm band! Besides repeater user frequencies, the band is also used to link repeaters together, plus simplex activity. Here is just a sample of the chat on the WWW (Thanks to Hats@Stevens.com and ATV@Tallahassee.net) about ATV use and activity and equipment on this band...

From: wb4iuy@ipass.net (Dave Hockaday)

I've just uploaded yet another update to the Wavecom Jr. 2.4 ghz project page at http://w~w.ipass.net/teara/atv4.html . Kip Turner W4KIP has more info on a device to boost the 2.4ghz TX to 250 mw very inexpensively. Kip's info is just below Alan Glynn's area.
Is anyone else working on this project as well??

From: stevem@w6yx.stanford.edu (Steve Muther)

Some notes for you guys with the Wavecom systems: Out here in the Bay Area we have been using 2.4GHz as our repeater output for years. Sources for 2.4GHz antennas have come and gone, but right now the best deals on high gain (dish) antennas are coming from the MMDS or "Wireless Cable" market. They operate just above our 2.4GHz band. Checkout: http://~ww. paytv.com/receive. html For antenna manufacturers. We have been buying 24dB gain BBQ grill style dishes from California Amplifier for about $42 each (including shipping) at 5pc minimums. You might also hnd some of the information on our web page useful. It has been recently updated. http:/ /w6yx. stanford. edul stevemlatvl Have fun! Steve Muther WF6R

From: stevem@w6yx.stanford.edu (Steve Muther)

Our repeater here in Palo Alto CA has had its output on 2.4GHz for over 10 years and has worked quite well for us. We chose the exact output frequency of 2429.25MHz so we could use off the shelf downconverters that were designed for the "Wlreless Cable" and "Instructional Television" services operating between 2.5 and 2. 7GHz. Most of these downconverters are broad enough to operate down at 2.4GHz. Some have front end filters which need to be changed or bypassed. Since the LO in these converters is typically at 2278MHz, our output frequency minus the LO gives an IF of 151.25MHz which turns out to be CATV CH-19.

For the repeater output on 2.4GHz, we use a Scientific Atlanta VSB-AM exciter near 120MHz and upconvert to 2.4GHz where the signal is amplified by a very linear traveling wave tube putting out about 20W PEP. That might not sound like a lot of power, but at 2.4GHz, receive dishes have quite a bit of gain. A 2 to 3 ft dish in most areas of the South Bay works just fine. More info on our 2.4GHz operation and downconverters can be found on our web page: http://w6yx . stanford. edul stevemlatvl There are some links to commercial sites there where you can learn about downconverters and antennas for 2.4GHz. A web search for terms like "Wireless Cable", MMDS, ITFS will also turn up some interesting stuff. Have fun, Steve Muther WF6R

From: stevem@w6yx.stanford.edu (Steve Muther)

>Hmmm. ..interesting. I've never heard of these things you mention. Pretty ingenious to design the system around off the shelf items. That's kinda what>I had in mind as well. Do you have any more info on these downconverters?

Check the addresses and keywords mentioned in my original reply.

>Other than the fironf end, what other changes were required?

Thats all, and in most cases, the front end needs no mods. It just gets you a couple more db improvement which may not be needed.

>Hmmm... I see. I just realized that your operating mode was AM, instead of FM. What has been the best DX into the system, and what are users using for transmitters?

The output of the repeater is at 2.4GHz and it is AM to make it easy to receive with just the addition on a downconverter. The primary input to the machine is 1255MHz FM, we will soon be adding 10GHz FM. DXin the Bay Area is not really possible because it is surround by mountains. We prefer to think of our system as having good P5 coverage in the South Bay proper. That extends out about 30Mi from the repeater. Most of these questions can be further clarified by looking around our web page.

>Thanks for the address, Steve. I'd like to add it to my 2.4 ghz project page, if you don't mind. 73 de Dave Hockaday WB41UY. No Problem. Steve Muther WF6R

DAYTON FRIDAY NITE ATV

The Fast Scan ATV Party/Meeting will be held on Fri. May 16th at 7pm. The location will be at the West Carrollton Lions Club at 435 East Main Street, West Carollton, Ohio which is about 25 min from the Dayton Hamvention. This event is being sponsored by the ATCO & HATS Fast Scan ATV Clubs. Plan on bringing ATV Video tapes, ATV Club projects or your own ATV project for show and tell. If you get lost call 859-7276 (W. Carrollton Lions Club) For more info contact John Hey at W8STB@concentric.net or 937-859-5294.

Directions.From Dayton head South on 1-75, Take West Carrollton exit #47, stay in right lane, pass football field and Jr High, At traffic light turn right onto Cedar Street go one block and turn right onto East Main. The Lions Club is the last building on the left (grey).

Directions from Cincinnati, Ohio take 1-74 to exit #44 Miamisburg-Centerville. Stay in middle left hand turn lane and turn left onto route 725. At Alex Rd turn right. After crossing RR tracks go to 2nd traffic light and turn left onto Central Ave. Get in right hand lane, pass football field and the Jr High. At traffic light turn right onto Cedar go one block and turn right onto E. Main. The Lions Club is the last building on the left (grey).

SK W8AER Dave Sears

Age 85, of Reynoldsburg Tuesday, Mt. Carmel East Hospital. Charter member of ATCO, better known as W8Always Eager and Ready, enjoyed 70 cm and 23 cm ATV. His vintage micropone collection was his most prized possession. His B&W test card pattern will be missed by many. Dave passed away while under gpoing surgery for colon cancer. [tnx w8dmr]

WEB ATV

Another note to let you all know that my web page has been updated again I have added another AVI file. This one is of the record reception 2 1/2 years ago of the Hawaii ATV station KH6HME on 434 MHz in California. This was a span of 2512 miles. This was received by KC6CCC. This AVI file is about 45 seconds and is about 2.3 MB. My web page is at: http://web.io-online.com/users/forsberg/atv.htm 73, Bruce WB61ZG I will be changing intemet providers soon so the following web address will no longer be valid in a couple of weeks: http://web.io-online.com/users/forsberg/atv.htm To access the Southem Ca. ATV Sights and Sounds ATV web page please use: http://www.qslnet/wb6izg. Sorry if this causes any inconvience. 73 Bruce WB61ZG ATV Home Page: http://www.qsl.net/wb6izg

Cruising the Web I found an ATVer in Alameda, WA6ZJG, who has a live camera attached to his tower and which can be v/iewed in real time on the Web! He has arrow controls on the screen where you can even rotate the camera with your mouse! Of course after the command, it has to move the camera, then redownload and compile a new JPG image for display on the Web page, but it only takes a few minutes. Neat stuff! Check it out...http://citynight.com/livecam.html. Tom KC6TNB

Hello ALL! This is just a little note to say that the Regina Emergency Communications Team (RECT) has joined in. We've been operating ATV in Regina for a year now and have a repeater setup for 439.25 input and 1277.25 output. More work to be done but its all in fun ... 73s for now David Dunster, VE5DGD

Folks.... Its YOUR MONEY! Demand better from your elected oficials!! No matter which "party" is in power, the "party" is being paid for with YOUR money! http://www.whitehouse.gov/ send an email to the President! http:/www.senate.gov/ get your Senator's email addresses; http:/www.house.gov/ get your Rep's email addresses Or...for a complete listing of members of the US CONGRESS go to: http://policy.net and then click on "A Guide to the US Congress"

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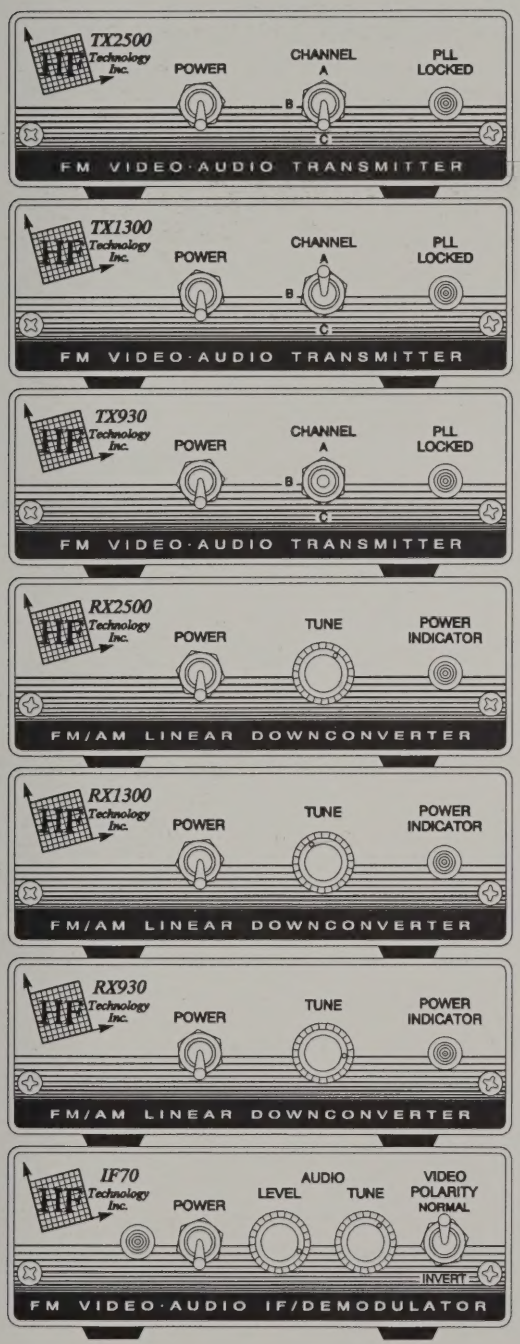

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You can show the shack, home video tapes, zoom in and describe projects, show computer graphics and programs, repeat SSTV or even Space Shuttle Video and audio if you have a TVRO. Go portable or mobile, do public service events, RACES, AREC, CAP, even transmit the radio club meetings to those hams that can't make it.

*DX is up to 90 miles snow free line of sight using 14 dBd beams and 100 ft. of Belden 9913 low loss coax simplex. Check the ARRL Repeater Directory for ATV repeaters in your area or call us for info on other ATVers in your area.

Transmitting equipment sold only to licensed Tech class or higher Radio Amateurs, verified in the Callbook, and used for legal purposes per 47 CFR part 97. If newly licensed, moved or upgraded, mail or fax a copy of your license or test certification.

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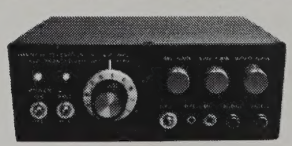

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KLM	440-16X	14 dBd	$142
KLM	440-10X	11 dBd	$82
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